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DEPARTMENT OF HIGHWAYS

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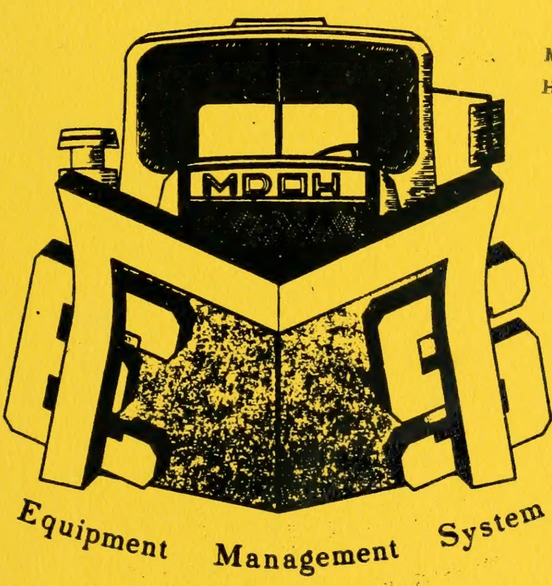

MANUAL

PLEASE RETURN

REV 12/89

MONTANA DEPARTMENT OF HIGHWAYS

EQUIPMENT BUREAU

EQUIPMENT MANAGEMENT SYSTEM MANUAL

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EQUIPMENT BUREAU

EQUIPMENT MANAGEMENT AND OPERATIONS MANUAL

REFERENCE NUMBERS

This Manual is divided into four (4) sections. Introduction, EMS Systems, Rental Rates and Equipment Bureau Numbered Memos. (Yellow tabs) Each of the manuals Divisions can be made up of numerous sections (Orange tabs).

REFERENCE NO.

EMS - XX X X

Designates EMS Manual ---------

Manual Section ---------------------

Sub-Section -----------------------------

Related Sub-Section Materials ----------------

EXAMPLE OF A REFERENCE NUMBER

EMS - 06 1 0

Shop Procedure ----------------

Equipment Repair Codes -------------

No. Sub-Section Related Materials -------

JH:1:1rk:21A-2

Fleet Management Policies in Section 1200, will be identified by the Manual Section Code, year and consecutively numbered for that year.

EXAMPLE FLEET POLICIES AND MANAGEMENT INFORMATION (Section 1200)

EMS - 12 85.01

Designates EMS Manual ------------

Manual Section -----------------------

Year Policy Issued ------------------------

Order Policies Issued -------------------------

INTRODUCTION

The Montana Department of Highways has an Equipment Management System (EMS) to monitor fleet operations, maintenance, shop performance and production and integrated financial information. The EMS system was designed to provide fleet information to all levels of vehicle and equipment managers.

This manual is designed to describe the policies and procedures of the EMS system. It also contains the guidelines that are needed to use the system.

History

Equipment Bureau

The Equipment Bureau was established by House Bill No. 34 which made the State Highway Commission the constitutional custodian of all state motor vehicles effective July 1, 1971.

The statewide Motor Pool operated under HB34 until July 1, 1974 when Senate Bill No. 367 became effective. This Bill disbanded the Statewide Motor Pool and created a Helena Based Motor Pool and returned all former vehicles and equipment to the Highway Department. Under both situations, the Motor Pool and Equipment Division administered and managed the Department's fleet.

In 1982 the Department reorganized and the Motor Pool and Equipment Division became the Equipment Bureau of the Maintenance and Equipment Division with clearly defined fleet functions and responsibilities.

Equipment Management System

The 48th Legislator mandated that the Department of Highways institute numerous management systems, one of which was Equipment Management. To accomplish the mandate, a steering committee was established to provide direction and advice during the EMS system development. The primary element of EMS system development was a needs analysis that identified needed information needs by each level of management. Major considerations of system development were:

- Fleet operations - data output detailing fleet operation and costs.
- Shop operations - information from shops regarding, repairs made and staffing.
- Data input - keeping data entry to a minimum and utilizing all present systems (integration) where feasible.

Only essential information was considered and the system was developed under the following objectives:

- Preserve the investment made in the fleet through timely servicing, preventive maintenance and repairs;
- Maintain equipment rental rates and financial information;

- Identify fleet repairs and causes so as to reduce downtime;
- Maintain an equipment replacement component that identifies equipment that has reached economic life;
- Ensure efficient and economical use of the fleet and manpower; and
- Purchase vehicles and equipment that are multifunctional and that will support maintenance, engineering, construction and other user requirements.

The EMS system described in this manual is designed to provide necessary information concerning shop operations, utilization and costs and provide procedures for budgeting.

ORGANIZATION

General Organization

The Equipment Bureau provides, maintains and administers all vehicles and equipment required by the Department of Highways. The Bureau's goal is to provide economical equipment that is multi-functional, safe, and accomplishes the required tasks. To that end, Equipment Bureau personnel are assigned to administrative, financial, purchasing, and technical services. The central shop and Motor Pool are also administered by the Equipment Bureau.

The Equipment Bureau is required to establish policy for fleet administration, budgets, purchasing and allocation of vehicles and equipment to field operations.

Bureau Positions

A) Chief Equipment Bureau

B) Program Management - Responsible for Management Systems, fiscal responsibilities, Motor Pool, purchasing and administrative support.

C) Equipment Services - Provide technical expertise, monitor maintenance programs, supervise central shop, and fleet repairs.

D) Administrative Officer - Purchasing of parts and materials, specification development, management systems, accounting and administrative support.

E) Central Shop Supervisor - Fabrication and assembly, receiving, repairs, and disposal preparation.

Central Shop

The central shop is a fabrication and retrofitting facility. Equipment is received, surplused, rebuilt, and manufactured. This shop also maintains units from sections of the Butte Maintenance Area that are in close proximity to Helena.

Area Shops

The eleven (11) area shops are primarily repair facilities that perform major and minor repairs on each Area's fleet.

Purchasing and Replacement:

Equipment purchasing is based on field requests, data from the EMS replacement component and recommendations by the Equipment Planning and Evaluation Committee. The replacement process is as follows:

- The Field Maintenance Chiefs, with concurrence of the District Engineer, submit specific needs to the Equipment Bureau;
    - + All other areas also submit their needs to the Equipment Bureau.
- Requests are compiled by the Equipment Bureau and then jointly reviewed with Equipment Planning and Evaluation Committee. This process is comprised of:

- + combining all requests;
- + review utilization, age and mileage of equipment,
- + reduce the requests to match available funding;
- + obtain approval from the Equipment Planning and Evaluation Committee;
- + obtain top management and subsequent legislative approval; and
- + finalize specifications and requisitions for purchasing.

The Bureau works closely with the field as well as the budget section of the Centralized Services Division in establishing biennium budgets. The budgets and operations plans provide:

- Personnel requirements and needs;
- fleet operations and maintenance costs;
- zero based budget requirements;
- funds required for fleet replacement;
- other financial information.

Through the EMS budget component, the budget is closely related to actual field operations.

EMS SYSTEM

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Goals and Concepts 0310

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Computerized System Support 0330

Interdepartmental Relationships 0340

Equipment System Flow Chart 0350

EMS SYSTEM INTRODUCTION

The Montana Department of Highways developed an equipment management system (EMS) to help plan, monitor and control fleet operations. The system is designed to serve a wide range of equipment management needs.

This Manual describes the system, procedures to operate, reports provided and other information that assists day-to-day management of the fleet. This manual is to be used as a general management reference for the Department's fleet.

This manual is organized into three major sections, which include:

- Organization -- a general description of the functions and responsibilities of headquarters and field regarding equipment management.

- Equipment Management System -- a detailed description of the Equipment Management System (EMS) including system operation, shop scheduling, preventive maintenance and equipment replacement procedures; and

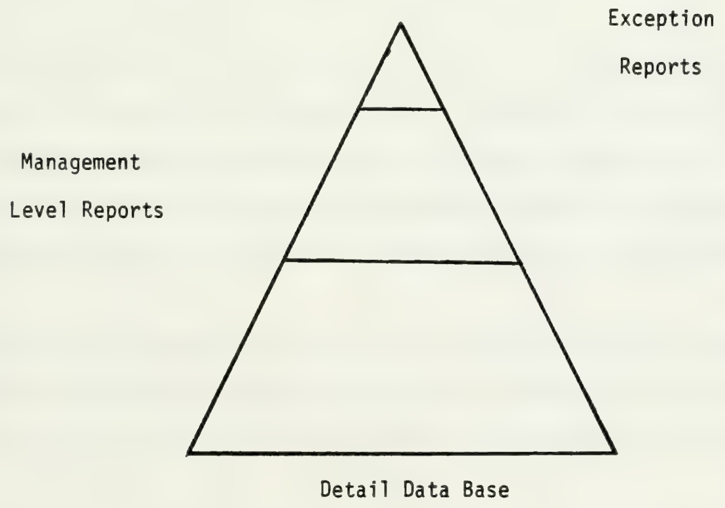
- Fleet Management -- basic information regarding management of the fleet such as training, equipment procedures and Department policies.

GOALS AND CONCEPTS

This section describes the basic concepts that have been used to develop and update the Equipment Management System. These concepts and the resulting system are a result of design and research conducted by the Equipment Bureau, Burke and Associates and the Equipment Planning and Evaluation Committee.

INFORMATION PYRAMID

The Department of Highways' equipment management system is based on an information "pyramid."



The apex of the "pyramid" consists of a few summary reports that give a general overview of fleet and shop performance. These reports reflect a number of "performance indicators" that, while not conclusive in themselves, provide a general overview of fleet operations. These indicators include:

- costs and revenues;
- availability and utilization;
- shop performance.

Any summary report may require further investigation to support indicated results. The remainder of the "pyramid" contains increasingly detailed information from which the performance indicators are derived.

Equipment managers need to go no lower into the "pyramid" than necessary to obtain the information that they may need. Emphasis is placed on "managing by exception" -- detecting problem areas using summary reports, then collecting the necessary detailed information to formulate appropriate courses of action. Reports are formated to facilitate quick assimilation of information.

The base of the pyramid provides the detail and data for the system. This detail is necessary to support both management information as well as detailed equipment costs used in the State Budgeting and Accounting System (SBAS).

INFORMATION NEEDS

The Equipment Management System categorizes the Department's information needs into three major areas, equipment performance, shop performance, and administrative records. These areas, along with examples, are discussed below.

Equipment Performance

It is important for the Department to have accurate, information on how the fleet is performing. Does the fleet meet the needs of the user? Is it being operated and maintained at minimum cost? Some examples of equipment performance information include:

- Utilization. This is information on a unit by unit and/or class-by-class basis of how well the fleet is being utilized.
- Availability. How much time is the fleet available for use? Is downtime limiting the quantity of work performed?
- Cost. What are the total costs to operate and maintain the fleet? Do specific units or equipment classes have excessive repair or operating costs? This information is important so as to minimize costs and make sound replacement decisions.
- Repair History. The type and frequency of repairs that are being performed is essential information in helping to determine fleet performance, and replacement considerations.

Shop Performance

In addition to knowing how well the fleet is performing, it is important to have information on how the shops are performing. Some examples of shop performance information include:

- Work by Repair Activity. How much time is being spent doing what types of repairs by unit and by class of equipment?
- Scheduled Work. What percent of repairs are scheduled and are therefore less disruptive of shop operations?
- Shop Utilization. What percent of shop time is spent on work other than direct repair, such as overhead non-reimbursable work, leave and work for others?

Administrative Records

The Department owns, operates and maintains over 3,500 pieces of equipment. It is essential to account for and keep track of the fleet. All costs charged to the units must be properly accounted for and balanced with the rental rate charges.

The equipment management system provides the various reports needed to keep track of the fleet.

SYSTEM DEVELOPMENT

Basic guidelines in the development and improvement of the system was: (1) make it simple to use and easy to report, (2) use as much of the existing equipment information system as possible (3) be compatible with other Department systems (such as SBAS and Maintenance Management). Using these basic guidelines the system was developed over a relatively short period of time and with very little change in field reporting, paperwork and data entry.

SOURCES OF INFORMATION

The Equipment Management System uses accounting information supplied initially from field reporting, as well as cost data from the payroll and stores systems. Changes to field reporting procedures were kept to a minimum. EMS relies on two basic documents: (1) the Shop Job Order (2) the Equipment Operator's Usage Report. The Shop Job Order provides information regarding what work was done to a piece of equipment and how much time was spent doing it.

The Equipment Usage Report supplies usage data, by account code, as well as preventive maintenance information such as completion of level 1 services and add-oil.

All labor, fuel and parts information is obtained from Accounting, Payroll and Stores.

OUTPUT REPORTS

There are output reports designed to be used by various levels of equipment managers. The primary reports are listed below. A detiled description of each report may be found in the "EMS Management Reports" section 0500 of the manual.

Fleet Performance

- Fleet Assignment by Class - Past 12 months (EMS 01)
- Division Summary by Class (EMS 02)
- Substandard Unit Report (EMS 04)
- Equipment Call-Back Report (EMS 05)
- Section Equipment Summary (EMS 10)
- Downtime Report (EMS 16)

Shop Performance

- Shop Production Report (EMS 06)
- Shop Performance Report (EMS 07)
- PM Program Summary (EMS 08)

- Shop Performance Review (EMS 14)
- Unaccomplished Level II Service Work (EMS 17)

Administrative and Cost Information

- Fleet Summary (EMS 11)
- Shop Repair Report (EMS 12)
- Repair Categories by Shop (EMS 12A)
- Monthly Fuel Usage (EMS 15)
- Shop Staffing (EMS 18)
- Highway Equipment Inventory Management Report (EB 023)
- Highway Equipment Operating Cost Report (EB 008)
- Monthly Usage Report(EB 0215)

The break out of reports into these three broad categories is somewhat arbitrary because many of the reports were designed to provide information to a specific level of management. For example, the Section Equipment Summary report (EMS 10) is designed to provide information that a crew supervisor may use to review equipment assigned to him, whereas the Fleet Summary Report (EMS 11) is a one-page summary of the entire fleet for use by top management.

SHOP SCHEDULING

Shop scheduling provides shop supervisors with a basic tool to better manage the flow of work through the shop and to better utilize mechanic's time. Scheduling procedures include:

- Use of a standardized Shop Job Order to record work, assign work, and record the time spent.
- Job Order wall racks visually keep track of assigned work in progress and work in back log.
- Keeping track of scheduled versus unscheduled repairs so that unscheduled work can be identified and better managed.
- Performing preventive maintenance work to reduce the amount of breakdowns; and

- Information to better manage shop personnel.

Additional details of shop scheduling procedures may be found in section 0600 of the manual.

PREVENTIVE MAINTENANCE

Another requirement of the equipment management system was to provide a preventive maintenance program to:

- reduce major repairs;
- reduce downtime; and
- reduce disruption caused by breakdowns.

The preventive maintenance program defines specific responsibilities from an equipment operator to the Director of Highways. The program also defines the specific work to be accomplished and the prescribed interval between services. The PM program is detailed in section 0700 of the manual.

EQUIPMENT REPLACEMENT

Procedures are needed to identify vehicles and equipment that have reached their economic life. This requires two elements:

1. A funding policy that generates sufficient revenues through rental rates to cover the cost of new equipment.

2. A detailed analysis of all costs associated with owning a piece of equipment.

To meet these needs, rental rates that include replacement funds, and appropriate budget levels have been justified using EMS information. Also, procedures have been developed to determine when a unit should be replaced based on such factors as usage, operation and maintenance costs and obsolescence.

REPAIR CODES

There are 32 repair codes that are used to identify the various kinds of repair work performed including fabrication and preventive maintenance work.

Repair codes give managers a clear indication of what type of work is being performed and the amount of time it takes to make certain repairs. This allows an evaluation of both the performance of the fleet and the shops throughout the state.

Detailed description of the repair codes are included in the Systems Operation section of the manual.

COMPUTERIZED SYSTEM SUPPORT

The Equipment Management System depends heavily on computer processed data. Data is input both at the District and Area levels, as well as at headquarters. The EMS also uses data from other systems.

Field Input

Data from the Shop Repair Order and the Operator Usage Report are entered in the field. The Shop Repair Order is entered at either the Area or District offices and Operator Usage Reports are sent to the District offices for data entry. Data is edited before being transmitted to Helena for processing.

Headquarters Input

Equipment Bureau personnel are responsible for editing data and maintaining the equipment system files. The Bureau is also responsible for generating and distributing reports and correcting field errors.

Detailed data input procedures are provided in the Systems Operation section of the manual.

INTERDEPARTMENTAL RELATIONSHIPS

EMS relies as much as possible on other department and statewide systems. Use of data from these systems accomplished two goals: (1) EMS financial data is compatible and reconcilable with other accounting data; (2) the need for additional field reporting was kept to a minimum. This section describes how the equipment management system relates to other departmental systems.

STATE BUDGETING AND ACCOUNTING SYSTEMS (SBAS)

SBAS is the Statewide Budgeting and Accounting System that defines cost accounting procedures. Since equipment earns and expends funds, all procedures must meet SBAS requirements. Also, since equipment has a variety of users who pay rental rates, the actual rates must be fully auditable and compatible with SBAS.

MAINTENANCE MANAGEMENT SYSTEM (MMS)

The Maintenance Management System helps manage, budget and account for all work performed by maintenance crews. Because equipment is a major resource and represents a major budget item, it is important for both systems to be able to supply each other with reliable data.

Through standards, MMS will estimate the equipment needed to meet a given work load. EMS can tell Maintenance how well the equipment is actually being

utilized. Using utilization and downtime information, Maintenance can adjust or realign actual assignment to improve overall utilization and possibly reduce the total number of units.

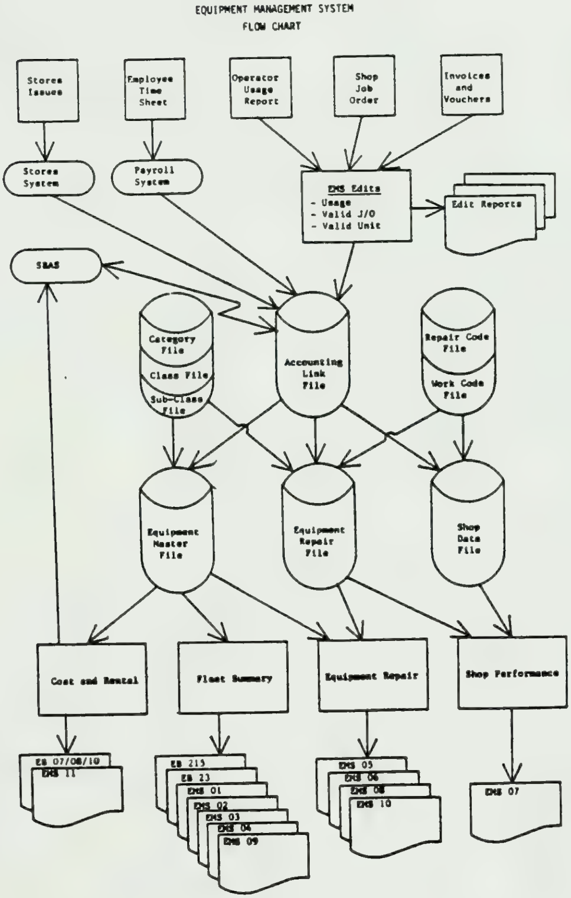
A major difference between the systems is the reporting of usage to obtain equipment costs. MMS reports usage by class of equipment and by activity and distributes the charges to obtain activity costs. There is no need to report usage by activity in EMS, subsequently a separate, bi-weekly Operator Usage Report is used (EMS-01).

STORES AND PAYROLL SYSTEMS

The Equipment Management System is dependent upon the stores, payroll, and accounting systems for parts and labor costs. All parts and labor charges are made through these systems. As in the past, direct labor hours and/or parts must be reported to an equipment unit number. Mechanic repair time charged through the payroll system may not match the labor hours reported on the Shop Job Orders because of different reporting criteria. However, the reports should be reasonably close if all hours are properly recorded.

The Equipment Management System also uses information from the PPP system to identify mechanic classifications.

EQUIPMENT MANAGEMENT SYSTEM FLOW CHART



EMS System Input Forms

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Payroll Time Slip	0430
Transfer Warrant Claim	0440
Stores Issues	0450
Transfer Document	0460

SYSTEM OPERATION FORMS

This section of the manual discusses the various sources of data input.

Input Procedures

The Equipment Management System uses several methods to capture data. The primary forms used to collect data are the Shop Job Order (EMS-2) and the Operators Usage Report (EMS-1).

Form EMS-1

The Operators Usage Report is used to collect usage data (metered miles/hours) as well as assigned data (tie-up time) and other information such as completed level 1 services and add-oil. This form is also a source document for equipment charges and requires a supervisor's initials.

Form EMS-2

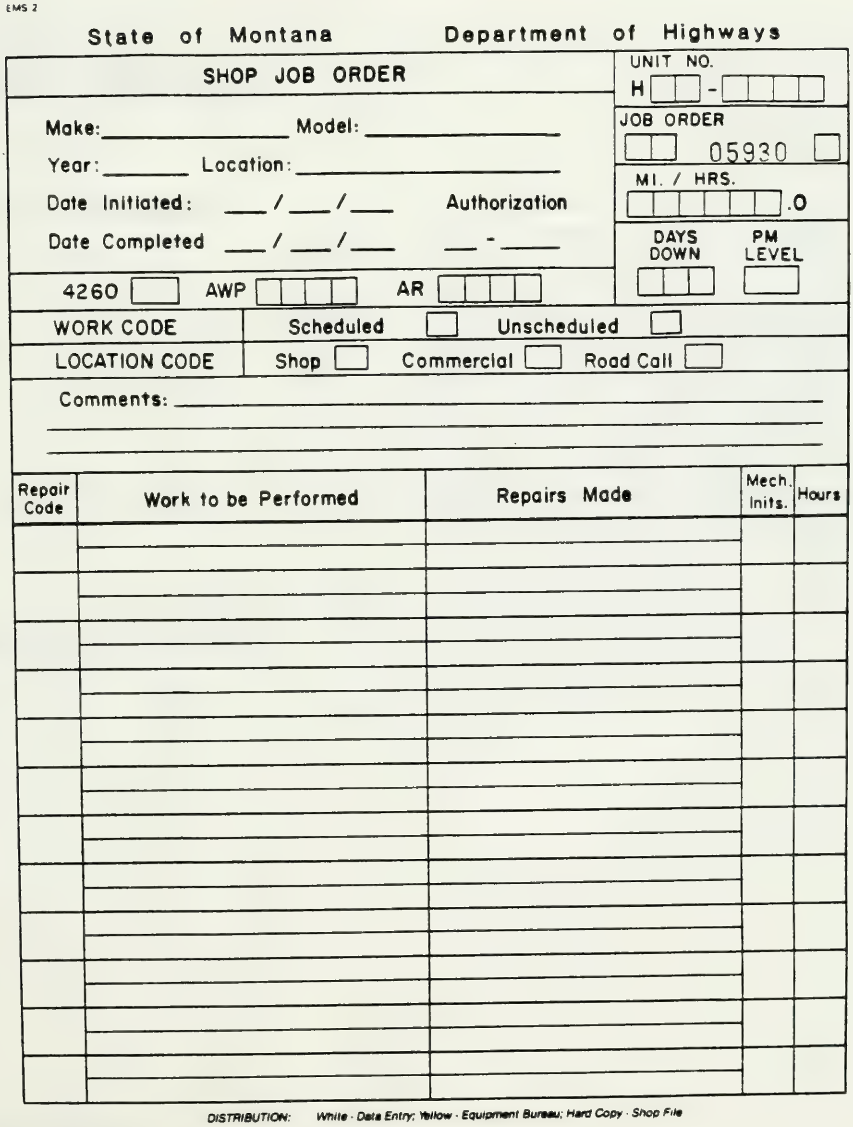
The Shop Job Order is used to collect basic information concerning the types of repairs being performed and the time spent on these repairs. This requires the reporting of actual mechanic hours by unit number and by repair code. It also includes other information. See the shop procedures portion of the manual - Section 0600.

The following sections show the basic documents that feed the EMS system.

EMS-0420

EXAMPLE

SHOP JOB ORDER



EMS 2

State of Montana Department of Highways

SHOP JOB ORDER

UNIT NO.
H ☐☐ - ☐☐☐☐

JOB ORDER
☐☐ 05930 ☐

MI. / HRS.
☐☐☐☐☐☐ .0

Make:________ Model:________

Year:________ Location:________

Date Initiated: ___/___/___ Authorization

Date Completed ___/___/___ __ - ____

DAYS DOWN ☐☐☐
PM LEVEL ☐

4260 ☐ AWP ☐☐☐☐ AR ☐☐☐☐

WORK CODE: Scheduled ☐ Unscheduled ☐

LOCATION CODE: Shop ☐ Commercial ☐ Road Call ☐

Comments: ________

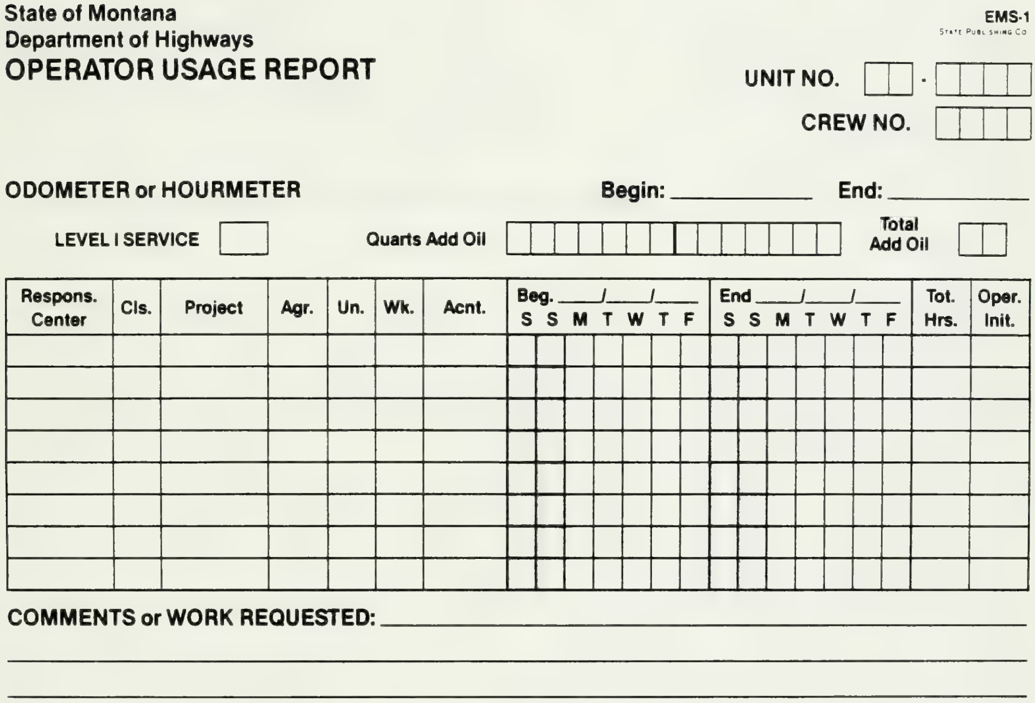
Repair Code	Work to be Performed	Repairs Made	Mech. Inits.	Hours

DISTRIBUTION: White - Data Entry; Yellow - Equipment Bureau; Hard Copy - Shop File

JH:1:lrk:227H-4

EXAMPLE

USAGE DOCUMENT



State of Montana
Department of Highways
OPERATOR USAGE REPORT

EMS-1
State Publishing Co

UNIT NO. ☐☐ - ☐☐☐☐

CREW NO. ☐☐☐☐

ODOMETER or HOURMETER **Begin:** ____________ **End:** ____________

LEVEL I SERVICE ☐ **Quarts Add Oil** ☐☐☐☐☐☐☐☐☐☐☐☐☐☐ **Total Add Oil** ☐☐

Respons. Center	Cls.	Project	Agr.	Un.	Wk.	Acnt.	Beg. ___/___/___							End ___/___/___							Tot. Hrs.	Oper. Init.
							S	S	M	T	W	T	F	S	S	M	T	W	T	F		

COMMENTS or WORK REQUESTED: ____

EMS-0430

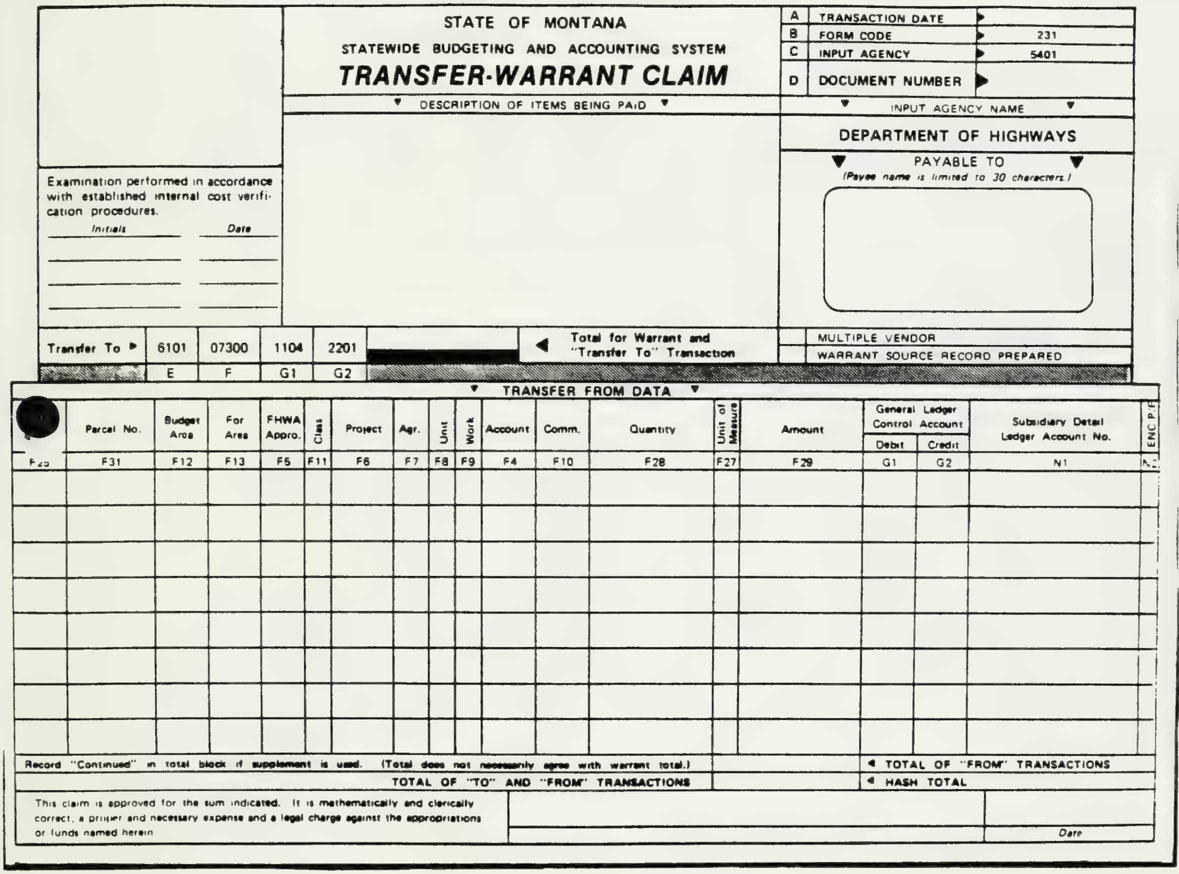
EXAMPLE

PAYROLL TIME SLIP

PAYROLL TIME SLIPS ARE BEING REVISED

EXAMPLE

TRANSFER WARRANT CLAIM



STATE OF MONTANA
STATEWIDE BUDGETING AND ACCOUNTING SYSTEM
TRANSFER-WARRANT CLAIM

A TRANSACTION DATE ▶
B FORM CODE ▶ 231
C INPUT AGENCY ▶ 5401
D DOCUMENT NUMBER ▶

▼ DESCRIPTION OF ITEMS BEING PAID ▼

▼ INPUT AGENCY NAME ▼
DEPARTMENT OF HIGHWAYS

▼ PAYABLE TO ▼
(Payee name is limited to 30 characters.)

Examination performed in accordance with established internal cost verification procedures.

Initials	*Date*

Transfer To ▶	6101	07300	1104	2201		◀ Total for Warrant and "Transfer To" Transaction
	E	F	G1	G2		

☐ MULTIPLE VENDOR
☐ WARRANT SOURCE RECORD PREPARED

▼ TRANSFER FROM DATA ▼

	Parcel No.	Budget Area	For Area	FHWA Appro.	Class	Project	Agr.	Unit	Work	Account	Comm.	Quantity	Unit of Measure	Amount	General Ledger Control Account Debit	General Ledger Control Account Credit	Subsidiary Detail Ledger Account No.	ENC P/F
F25	F31	F12	F13	F5	F11	F6	F7	F8	F9	F4	F10	F28	F27	F29	G1	G2	N1	N

Record "Continued" in total block if supplement is used. (Total does not necessarily agree with warrant total.) ◀ TOTAL OF "FROM" TRANSACTIONS

TOTAL OF "TO" AND "FROM" TRANSACTIONS ◀ HASH TOTAL

This claim is approved for the sum indicated. It is mathematically and clerically correct, a proper and necessary expense and a legal charge against the appropriations or funds named herein

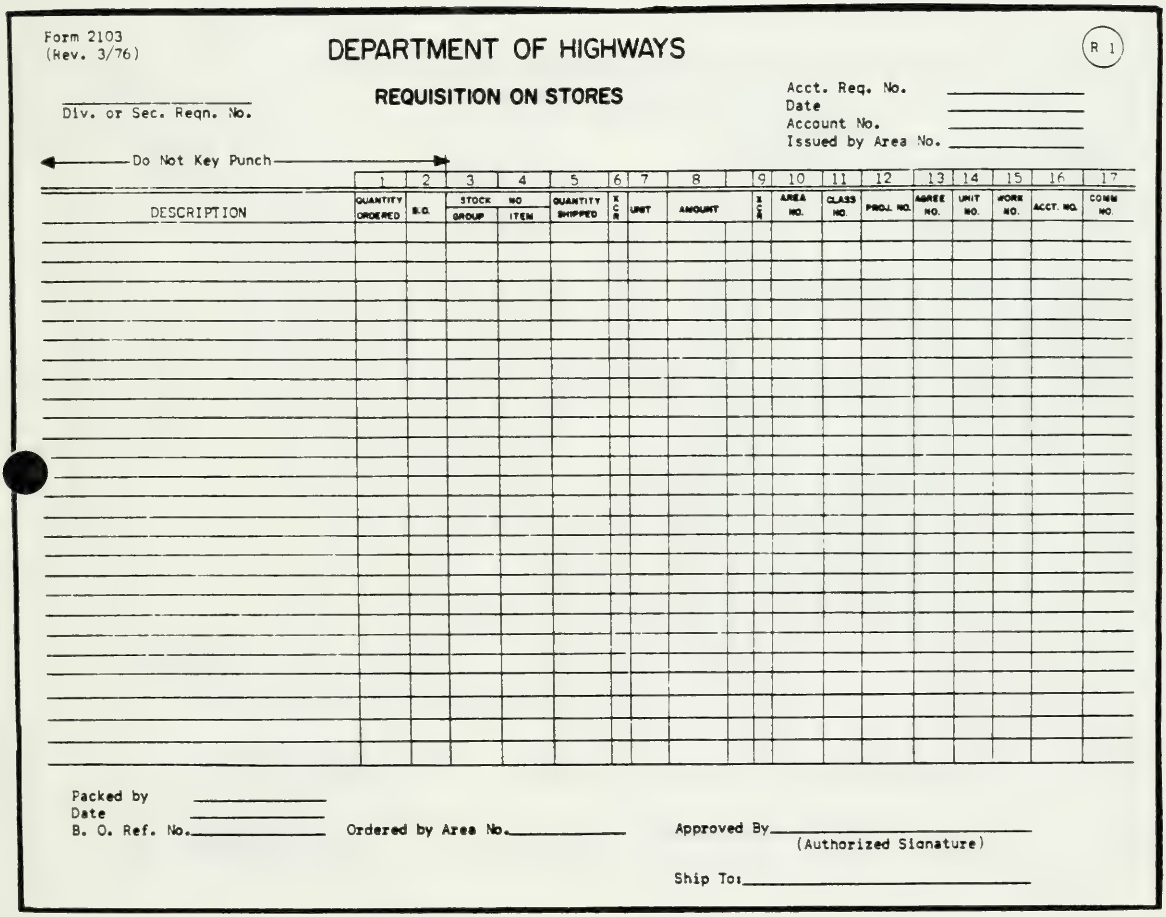
Date

1 of 1

JH:1:1rk:21D-6

EXAMPLE

STORES ISSUES



Form 2103
(Rev. 3/76)

DEPARTMENT OF HIGHWAYS

R 1

REQUISITION ON STORES

Div. or Sec. Reqn. No. __________

Acct. Req. No. __________
Date __________
Account No. __________
Issued by Area No. __________

← Do Not Key Punch →

	1	2	3	4	5	6	7	8		9	10	11	12	13	14	15	16	17
DESCRIPTION	QUANTITY ORDERED	B.O.	STOCK NO		QUANTITY SHIPPED	XCR	UNIT	AMOUNT		XCR	AREA NO.	CLASS NO.	PROJ. NO.	AGREE NO.	UNIT NO.	WORK NO.	ACCT. NO.	COMM NO.
			GROUP	ITEM														

Packed by __________
Date __________
B. O. Ref. No. __________

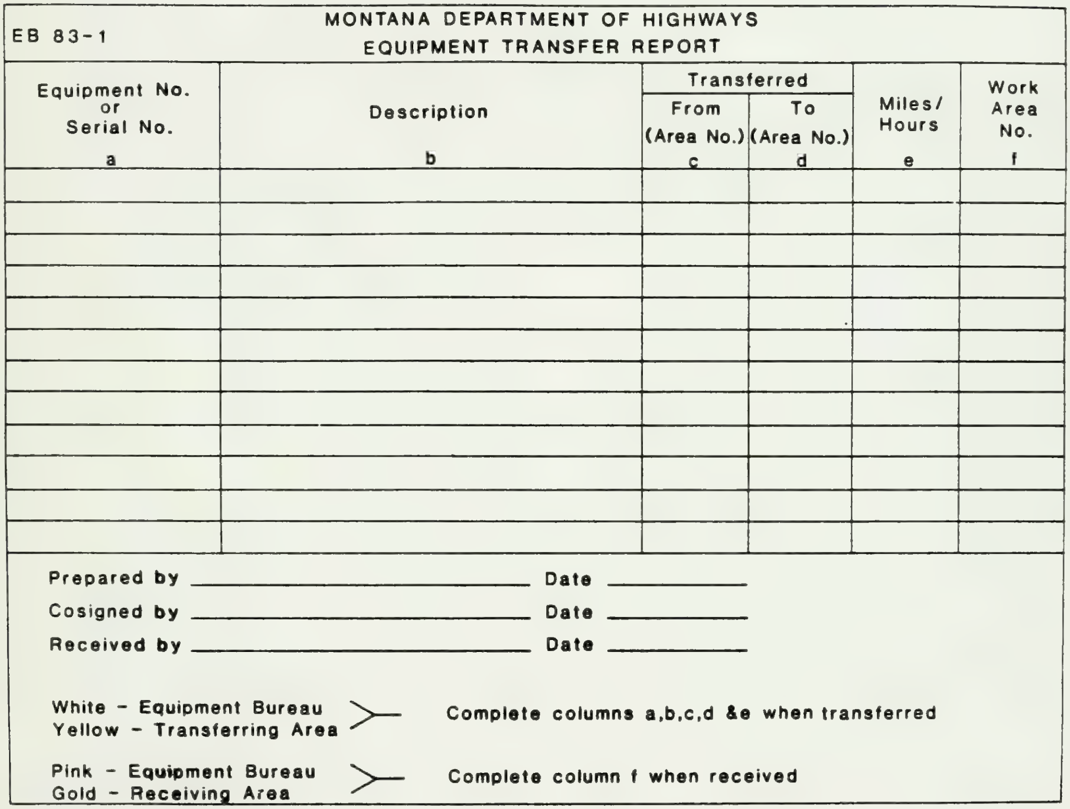
Ordered by Area No. __________

Approved By __________
(Authorized Signature)

Ship To: __________

EXAMPLE

TRANSFER DOCUMENT



EB 83-1

MONTANA DEPARTMENT OF HIGHWAYS
EQUIPMENT TRANSFER REPORT

Equipment No. or Serial No. a	Description b	Transferred		Miles/ Hours e	Work Area No. f
		From (Area No.) c	To (Area No.) d		

Prepared by ______________________ Date __________

Cosigned by ______________________ Date __________

Received by ______________________ Date __________

White - Equipment Bureau
Yellow - Transferring Area
Complete columns a,b,c,d &e when transferred

Pink - Equipment Bureau
Gold - Receiving Area
Complete column f when received

All department documents associated with cost data will be processed according to the policies and procedures of the Centralized Services Division.

If questions exist consult:

- P/P/P System for Personnel and Payrolls
- Accounting Manual for completion of forms associated with Accounting and SBAS and for purchasing procedures.
- Coding Manual for reference of appropriate codes of account, projects, areas, etc.
- Stores System Issues.

Rev. 10/88

EMS MANAGEMENT REPORTS

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CICS Access to On Line Report 0560

MANAGEMENT REPORTS INTRODUCTION

This section of the manual contains examples and brief descriptions of all output reports used in the Equipment Management System.

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. REPORT (continued)

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EMS-0500

MANAGEMENT REPORTS - ON LINE

REPORT

Number	Title	Reference
HI81	Equipment File Display	0550
HI82	Motor Pool File Display	0551
HI83	(See Equipment Replacement)	0552
HI84	Shop History File Display	0553
HI85	Motor Pool Vehicle Repair File	0554
HI86	Equipment Repair History File	0555
HI87	Class and Sub Class Standard Display	0556
CICS	ACCESS TO ON-LINE REPORTS	0560

DIVISION SUMMARY BY CLASS

EMS-02

This report provides cost, usage, and availability data for each unit for the current month and past 12 months.

Users: Equipment Bureau, Maintenance Chief, Shop Superintendent.

Frequency: Monthly.

REPORT DETAIL

Maintenance Area: The area for which the report is issued appears at the top of the page.

Class Number: Number of the vehicle class from the rental rates.

Description: Brief description of the appropriate class.

Unit No: Actual unit number within the class.

Crew No: The assigned crew number (maintenance sections use MMS crew numbers and all others use a number that does not interfere with MMS crew numbers).

Miles/Hours: Miles or hours by unit for

- Current Month
- Past 12 consecutive months
- Unit life total (last odometer reading).

Utilization:

- Percent available for current month and past 12 months.
- Percent used during the current month and past 12 months.

Operating Cost Past 12 Months: This shows the cost operating the of unit for the past 12 consecutive months for the following categories:

- Parts
- Labor
- Fuel
- Other (all other operating costs)
- Total

Downtime

- Current month,
- Past 12 consecutive months.

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                                                              MONTANA DEPARTMENT OF HIGHWAYS                                     REPORT #:   EMS 02
                                                                DIVISION SUMMARY BY CLASS                                        RUN DATE: 11/06/89
                                                                DIVISION MISSOULA                                                    PAGE:        1

                            MILES/HOURS                   UTILIZATION                      OPERATING COST PAST 12 MONTHS                      DOWN TIME DAYS
 UNIT      CREW    CURRENT    PAST       LAST        CURRENT      12 MONTHS                                                                    CURRENT   PAST
  NO.      NO.      MONTH    12 MO.      ODOM       AVAL USED    AVAL USED       PARTS      LABOR       FUEL      OTHER      TOTAL       MONTH   12 MO.

CLASS NUMBER: 00     DESCRIPTION: 00 PURSUIT CARS

 000202    0022     2000     39700      81200        88   46      99   96          59        248       1531       3864       5702           2       3
 000205    0022     2700     32450      43300        97   46      99   86         104        283       1188       3801       5376           0       3
 000214    0022     1250     19069      20800        88   46      99   38         141         31        770       1893       2835           2       2

CLASS TOTAL         5950     91219                   91   46      99   73         304        562       3489       9558      13913           4       8

CLASS NUMBER: 02     DESCRIPTION: 02 UTILITY VEH

 020012    0181       86      2386      75220        97   73      99   28          36        130        233       1747       2146           0       3
 020022    0186       06       978     118460        97    1      95   15         157        400        241       1759       2557           0      13
 020024    0181       00      2380      75580        97    0     100   31          47        363        191       1844       2445           0       0
 020034    0184     1070     16290      83300        97   52     100   82         192        402        767       2476       3837           0       0
 020039    0183      601      5117      56803        97   28      97   20          52        179        166       2580       2977           0       8
 020040    0181      887     10512      73550        97   29      99   62         118        146        384       2531       3179           0       3
 020041    1133      566      6738      57465        97   28      98   22         203        177        314       2436       3130           0       4
 020042    1132      488     11552      83688        97   10      99   80          74        257        517       2642       3490           0       2
 020052    0181      425     14705      21315        97   55     100   93          77        123        630       2950       3780           0       1
 020053    1132     1007     19926      28990        97   43      99   90          96        283        985       3099       4463           0       3

CLASS TOTAL         5136     90584                   97   32      99   52        1052       2460       4428      24064      32004           0      37

CLASS NUMBER: 03     DESCRIPTION: 03 SUBURBAN

 030225    0181      885      9692      55987        97   42     100   79          52         00        496       2430       2978           0       0
 030247    0182     1170     13265      45160        97   58      98   94          96        237       1213       2752       4298           0       4
 030248    0184      435      9938      37575        97   52      94   66         519       1333       1015       2453       5320           0      16
 030265    0162      340      3641       5090        97   42     100   28          00         00        311       1788       2099           0       0

CLASS TOTAL         2830     36536                   97   49      98   67         667       1570       3035       9423      14695           0      20

CLASS NUMBER: 06     DESCRIPTION: 06 COMPACTS

 060093    1140      614     10518      89260        97   23     100   87          00         52        369        251        672           0       0
 060107    1130      887      6494      92243        97   46     100   47          85         48        565       1603       2301           0       0
 060120    1133     1106     10946      70861        97   31     100   27          00         00        321       2262       2583           0       0
 060127    1132     2720     22500     103000        97   92     100   85          02        119        811       2492       3424           0       1
 060136    1132       00     17600      40360        97    0      99   81          85        186        434       2515       3220           0       2
 060145    0601      206     13459      36071        97   46     100   73          43        255        429       2623       3350           0       0
 060147    1134      861     19472      26009        97   46      99   69          30        115        592       2846       3583           0       3
 060160    0000     1074     17175      20899        97   46     100   58          41        107        422       2704       3274           0       1
 060161    0000      193      3115       4272        97   46     100   27          04         00         98       1295       1397           0       0

CLASS TOTAL         7661    121279                   97   42     100   62         290        882       4041      18591      23804           0       7
```

EQUIPMENT CALL - BACK REPORT

EMS-05

This is an exception report that identifies units that have returned to the shop for the same repair within a predetermined period of time. It identifies the unit, the date(s) of previous repairs, type of work (repair code) and hours worked. This report helps identify repeat work.

Users:	Equipment Bureau, Maintenance Chiefs, Shop Superintendents.
Frequency:	Monthly.

REPORT DETAIL

Maintenanc Area:	The area for which the report is issued will appear in the center of the page.
Unit Number:	The unit number experiencing a call-back.
Description:	Brief description of vehicle type.
Previous Order No:	Job order number of pervious repair.
Previous Date:	Date of previous job order.
Current Order No:	The number of the current job order.
Current Date:	Date of current job order that generated the recall.
CB:	(Call back). The Asterick designates the repair code on the current job order that also appeared on the previous job order.
Repr CD:	Repair code associated with the current job order.
Repair Description:	The repair code description for each repair code listed on the current job order.
Hours Worked:	Total repair hours by repair code.

MONTANA DEPARTMENT OF HIGHWAYS
EQUIPMENT CALL-BACK REPORT

STATEWIDE

REPORT #: EMS 05
RUN DATE: 11/07/89
PAGE: 3

UNIT NUMBER	DESCRIPTION	PREVIOUS ORDER NO	PREV. DATE	CURRENT ORDER NO	CURR. DATE	C B	REPR CD	REPAIR DESCRIPTION	HOURS WORKED
190540	19 DUMP TRUCK	51327850	6/89	51334270	10/89	*	31	CAB & CHASSIS - SUSPENSION	9
				51334270	10/89		2	DRIVE TRAIN - TRANSMISSION	5
				51334270	10/89		36	CAB & CHASSIS - BODY	7
190556	19 DUMP TRUCK	31323698	8/89	31335270	9/89	*	12	POWER PLANT - FUEL	9
		31513500	9/89	31335280			15	POWER PLANT - COOLING	6
		31523780	8/89	31334578			56	MISCELLANEOUS - OTHER	1
190596	19 DUMP TRUCK	51329220	8/89	51456890	10/89	*	32	CAB & CHASSIS - STEERING	5
					10/89		31	CAB & CHASSIS - SUSPENSION	7
190607	19 DUMP TRUCK	42325940	8/89	42685420	10/89	*	1	DRIVE TRAIN - CLUTCH	1
190803	19 DUMP TRUCK	22568940	5/89	22689540	10/89	*	12	POWER PLANT - FUEL	5
				22689540			31	CAB & CHASSIS - SUSPENSION	1
				22689540		*	33	CAB & CHASSIS - STEERING	2
				22689540			44	ELECTRICAL - LIGHTING	1
				22689540			51	MISCELLANEOUS - A.C./HEAT	3
190777	19 DUMP TRUCK	53327850	6/89	53334270	10/89	*	31	CAB & CHASSIS - SUSPENSION	4
				53334270	9/89		2	DRIVE TRAIN - TRANSMISSION	12
				53334270	9/89		36	CAB & CHASSIS - BODY	3
190387	19 DUMP TRUCK	41323698	8/89	41335270	10/89	*	12	POWER PLANT - FUEL	3
		41513500	9/89	41335280			15	POWER PLANT - COOLING	6
		41523780	8/89	41334578			56	MISCELLANEOUS - OTHER	4

SHOP PRODUCTION REPORT

EMS-06

This report summarizes, the number of repairs being performed and the average hours per repair for each shop. This data is broken down into the 32 repair codes that appear on the shop job order. The percent of time spent on each repair code is shown, based on the total hours reported. The report summarizes both the Current Month and the past 12 months. From this report equipment managers are able to determine the number, type and time spent on each repair in each shop.

Users:	Maintenance Chiefs, Shop Superintendents.
Frequency:	Monthly.

REPORT DETAIL

Maintenance Area:	The Area for which this report was issued will appear at the top of the page.
Description of Shop Job Order Repair Codes:	A listing of all 32 shop repair codes.
Current Month:	Repair codes utilized during the current month.

Number of Repairs:	The number of repairs, by repair code, for the reporting period. The total number of repairs appears at the bottom of the column.
Total Hours:	The hours, by repair code, spent on repairs. The total hours appears at the bottom of the column.
Average Hours:	The average time spent on each repair by repair code. The average time spent on all repairs appears at the bottom of the column.
Percent of Total:	Time spent in each repair code is express as a percent of the total.
Shop Total:	Total repairs, hours, and average hours for all repairs, including a percent of total.

Past 12 Months:	The same information as the current month except that the information represents a 12-month revolving history.

MONTANA DEPARTMENT OF HIGHWAYS
SHOP PRODUCTION REPORT
DIVISION: BOZEMAN

REPORT #: EMS 06
RUN DATE: 11/06/89
PAGE: 1

DESCRIPTION OF SHOP JOB ORDER REPAIR CODES	CURRENT MONTH NUMBER REPAIRS	CURRENT MONTH TOTAL HOURS	CURRENT MONTH AVERAGE HOURS	CURRENT MONTH PERCENT OF TOTAL	PAST 12 MONTHS NUMBER REPAIRS	PAST 12 MONTHS TOTAL HOURS	PAST 12 MONTHS AVERAGE HOURS	PAST 12 MONTHS PERCENT OF TOTAL
01 CLUTCH/TORQUE CONV	00	00	0.0	00	45	185	4.1	03
02 MAIN TRANSMISSION	00	00	0.0	00	11	56	5.1	01
03 AUX TRANS/TRANS CASE	00	00	0.0	00	01	31	31.0	00
04 DRIVE SHAFT/U-JOINTS	00	00	0.0	00	04	10	2.5	00
05 POWER TAKE OFF	00	00	0.0	00	04	25	6.3	00
06 DIFFERENTIALS/AXLES	00	00	0.0	00	30	129	4.3	02
07 FINAL DRIVE/PLANET	00	00	0.0	00	01	02	2.0	00
11 AIR INTAKE SYSTEM	00	00	0.0	00	04	04	1.0	00
12 FUEL SYSTEM	00	00	0.0	00	43	136	3.2	02
13 ENGINE REPAIR-MINOR	00	00	0.0	00	60	239	4.0	04
14 ENGINE REPAIR-MAJOR	00	00	0.0	00	12	373	31.1	06
15 COOLING SYSTEM	00	00	0.0	00	67	224	3.3	03
16 EXHAUST SYSTEM	00	00	0.0	00	23	47	2.0	01
21 HYDRAULIC SYSTEM	00	00	0.0	00	61	194	3.2	03
22 PLOWS	00	00	0.0	00	130	1199	9.2	18
23 OTHER	00	00	0.0	00	43	319	7.4	05
31 SUSPENSION SYSTEM	00	00	0.0	00	03	21	7.0	00
32 STEERING SYSTEM	00	00	0.0	00	36	172	4.8	03
33 BRAKE SYSTEM	00	00	0.0	00	66	193	2.9	03
34 WHEEL/HUB/BEARINGS	00	00	0.0	00	05	27	5.4	00
35 INSTRUMENTS/GAUGES	00	00	0.0	00	23	49	2.1	01
36 BODY REPAIR	00	00	0.0	00	20	129	6.5	02
41 IGNITION SYSTEM	00	00	0.0	00	15	40	2.7	01
42 STARTING SYSTEM	00	00	0.0	00	38	94	2.5	01
43 CHARGING SYSTEM	00	00	0.0	00	27	92	3.4	01
44 LIGHTING SYSTEM	00	00	0.0	00	123	283	2.3	04
51 AIR CONDITION/HEAT	00	00	0.0	00	05	14	2.8	00
52 TIRES	00	00	0.0	00	97	252	2.6	04
53 ASPHALT EQUIPMENT	00	00	0.0	00	19	160	8.4	02
54 MANUF/FABRICATE	00	00	0.0	00	21	194	9.2	03
55 PM LEVEL 1	00	00	0.0	00	73	88	1.2	01
55 PM LEVEL 2	00	00	0.0	00	73	1106	15.2	17
56 OTHER	00	00	0.0	00	142	519	3.7	08
SHOP TOTAL	00	00	0.0	100	1325	6606	4.9	100

SHOP PERFORMANCE REPORT

EMS-07

This report summarizes shop performance using such performance indicators as shop utilization, repairs performed, average hours per PM and distribution of shop labor. Also included is where repairs are performed, effectiveness of shop scheduling and the number of units maintained per mechanic. This report assists managers in evaluating shop staffing, utilization and performance.

Users:	District Engineers, Maintenance Chiefs, Shop Superintendents.
Frequency:	Monthly.

REPORT DETAILS

District:	The District for which the report is issued will appear at the top of the report. All information is based on the current month and past 12 consecutive months for each shop within a district including a District total.
Number of Mechanics:	Mechanics listed in PPP system at the time of the report.
Number of Units Maintained:	Total number of units within each maintenance area, including plows, sanders, etc.
Avg. per Mechanic:	Average number of units maintained per mechanic.
Shop Utilization:	All labor hours for the following breakdown are taken from the payroll.
Percent Direct Repairs:	All hours charged to 4110 Account by mechanics. (Direct Payroll Repair Charges)
Percent Others:	All hours charged to 4260 account. (Repairs related to damage by accident) All hours charged to authorized works in progress and accounts receivables. (Account 0385/0386)
Percent Overhead:	All hours charged to Account 4100. (All overhead payroll hours)
Percent Leave/Not	All hours charged to vacation, sick or other types of leave.

REPORT DETAILS - Continued

Number of Repairs:	Total number of individual repairs for current and past 12 months, less those that are charged to repair code 55 (PM).
Avg. Hours Per: Repair:	Average repair time is the total hours divided by number of repairs. Further details may be obtained from Shop Production Report (EMS-06).
Number of PM's:	Total PM's performed.
Average hours per PM:	Average hours required to perform each PM.
Work Codes:	This is the percent of scheduled or unscheduled repairs.
Scheduled:	Percent of repairs that are scheduled into the shop.
Non-Scheduled:	Percent of repairs that are not formally scheduled into the shop.
Location Codes:	Details at what type of shop the repairs were made.
Road Calls:	Percent of repairs that were made on the road.
Commercial:	Percent of repairs that were accomplished by an outside vendor.
Shop:	Percent of repairs that were made in the area shop.
PM:Repair Ratio:	The ratio of all PM's to all repairs.
Number of Repeat Repairs:	Actual number of call-back repairs within the last reporting period and for the past 12 months. See EMS-05 for actual repair codes and unit numbers.

MONTANA DEPARTMENT OF HIGHWAYS
SHOP PERFORMANCE REPORT
DISTRICT 41

REPORT #: EMS 07
RUN DATE: 11/06/89
PAGE: 6

DIVISION	GLENDIVE CURRENT MONTH	GLENDIVE PAST 12 MONTHS	WOLF POINT CURRENT MONTH	WOLF POINT PAST 12 MONTHS	MILES CITY CURRENT MONTH	MILES CITY PAST 12 MONTHS	TOTALS CURRENT MONTH	TOTALS PAST 12 MO.
NUMBER OF MECHANICS	4	3	4	4	5	5	13	12
NUMBER OF UNITS MAIN	241	243	246	245	299	294	786	782
AVG PER MECHANIC	60.2	81.0	61.5	61.2	59.8	58.8	60.4	65.1
SHOP UTILIZATION								
% DIRECT REPAIRS	70	73	74	65	57	64	67	67
% OTHERS	0	0	0	0	0	1	0	0
% OVERHEAD	13	15	10	15	34	23	19	17
% LEAVE/NOT WORKED	15	10	14	18	8	10	12	12
NUMBER OF REPAIRS	108	566	0	690	116	1415	224	2671
AVG HOURS PER REPAIR	5.7	9.7	0.0	5.6	4.5	4.8	5.1	6.7
NUMBER OF PM'S	3	62	0	45	7	98	10	205
AVG HOURS PER PM	23.6	33.0	0.0	17.2	15.7	15.4	19.6	21.8
WORK CODES								
% SCHEDULED	77	87	0	84	84	85	53	85
% NON-SCHEDULED	22	12	0	15	15	14	12	13
LOCATION CODES								
% ROAD CALLS	33	23	0	14	24	24	19	20
% COMMERCIAL	0	0	0	0	0	0	0	0
% SHOP	66	76	0	85	75	75	47	78
PM:REPAIR RATIO	1:036	1:009		1:015	1:017	1:014	1:022	1:013
REPEAT : TOTAL	1:015	1:017		1:016	1:011	1:014	1:012	1:015
NUMBER OF REPEAT REPAIRS	7	33	0	43	11	101	18	177

PM PROGRAM SUMMARY

EMS-08A

This is an exception report that lists all units that are within 80 percent of a level 2 service or have exceeded the service interval. Level II PM miles/hours are from the shop job order. Hours for equipment must be taken from EMS system hours; NOT hour meter readings.

Users:	Equipment Bureau, Maintenance Superintendent, Shop Superintendent.
Frequency:	Monthly.

REPORT DETAILS

Maintenance Area:	The area for which the report is issued will appear at the top of the report.
Unit No.:	The unit number for those units reaching the 80 percent or that are past due will be listed. Crew assignment may be determined from Division the EMS-02 report.
Unit Description:	Brief description of the unit.
Current miles/ hours:	Miles/hours of record at the time of the report.
Next Scheduled PM:	The miles/hours of the next scheduled service.
Current PM Status:	Units reaching the 80 percent or that are past due will be listed.

MONTANA DEPARTMENT OF HIGHWAYS
PM PROGRAM SUMMARY
DIVISION: BOZEMAN

REPORT #: EMS 08-A
RUN DATE: 11/06/89

UNIT NO.	UNIT DESCRIPTION	LAST REPORTED ODOMETER	NEXT SCH LEVEL II PM	CURRENT LEVEL II PM STATUS
020027	GMC JIMMY 4X2	93763	92011	SCHEDULE PM
020050	CHEV BLAZER 4X2	20272	16000	PM PAST DUE
060128	CHEVROLET CITATION 4/DR	61789	57893	SCHEDULE PM
070505	DODGE RAM D150 2 WH/DR PICKUP	120341	114243	PM PAST DUE
070559	GMC SIERRA 1500 1/2 TON PICKUP	91458	76494	PM PAST DUE
070578	GMC SIERRA 1500 1/2 TON PICKUP	62039	51083	PM PAST DUE
070690	CHEVROLET 1/2 TON PICKUP	82981	76137	PM PAST DUE
070719	CHEVROLET CR10903 1/2 TON PICKUP	59050	57565	SCHEDULE PM
070725	CHEVROLET CC10903 1/2 TON PICKUP	25967	16000	PM PAST DUE
080073	GMC 3/4 TON PICK UP	48017	46350	SCHEDULE PM
090072	CHEVY CR31003 1 TON W/ DUMP	18500	16000	SCHEDULE PM
120067	DODGE SPORTSVAN B300	102087	101276	SCHEDULE PM
190619	FORD DUMP TRUCK F800	102379	86532	PM PAST DUE
190648	GMC 7000 DIESEL DUMP TRUCK	120624	118896	SCHEDULE PM
190698	GMC 7000 DIESEL DUMP TRUCK	101005	99646	SCHEDULE PM
190710	GMC 7000 DIESEL DUMP TRUCK	89060	74818	PM PAST DUE
190751	GMC 7000 DIESEL PLOW TRUCK	55343	52636	SCHEDULE PM
190762	GMC 7000 DIESEL PLOW TRUCK	83289	81600	SCHEDULE PM
190783	GMC 7000 DIESEL PLOW TRUCK	36280	35896	SCHEDULE PM
190838	GMC 7000 DIESEL PLOW TRUCK	17507	16000	SCHEDULE PM
210045	IH 2000D W/5TH WHEEL	111289	109484	SCHEDULE PM
290019	FORD LT-9000 TANDEM DUMP	139908	139764	SCHEDULE PM
290054	GMC BRIGADIER NURSE TRUCK, USED	697465	694547	SCHEDULE PM

SECTION EQUIPMENT SUMMARY

EMS-10

This report provides a summary of units assigned by crew number. It allows equipment supervisors, to review the status of equipment usage, availability, utilization, PM's, fuel and oil consumption.

Users:	Maintenance superintendents, and those section supervisors whose personnel are assigned a crew number for equipment reporting purposes.
Frequency:	Monthly.

REPORT DETAILS

Maintenance Area and Crew Number:	The Area which the report is being issued will appear at the top of the page.
Unit Number:	The unit number of those units assigned to each crew.
Miles/Hours:	History of the unit for the current month, past 12 months, and life.
Past 12 Months:	Percent available and utilized for the past 12 consecutive months.
Next Service and PM Due:	Miles/hours when the next Level I or II scheduled service is due. "PM Due" is noted when a unit is within 80% of the scheduled service. "Past Due" is noted when a unit exceeds the interval.
Average Fuel:	Average miles/hours per gallon.
Downtime:	Downtime that has been reported for the current month and past 12 months.

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                                              MONTANA DEPARTMENT OF HIGHWAYS                                 REPORT #:   EMS 13
                                                SECTION EQUIPMENT SUMMARY                                    RUN DATE: 11/06/89
                                                 DIVISION: MISSOULA                                              PAGE:        8
                                                    CREW: 0181

 UNIT       MILES / HOURS        LAST      PAST 12 MONTHS        LEVEL I      LEVEL II  12 MONTH   DOWN TIME (DAYS)
  NO.   CURRENT MO  PAST 12 MO  ODOMTR  AVAILABLE  UTILIZED   SERVICE DUE    PM DUE   AVG FUEL   CURR MO  PAST 12     COMMENTS

020012        86        2386    75220      99         28         DUE          90621      9          0        3
020024         0        2380    75580     100         31       PAST DUE       90735     13          0        0
020040       887       10512    73550      99         62       PAST DUE       79936     25          0        3
020052       425       14705    21315     100         93          23290       36645     22          0        1
030225       885        9692    55987     100         79       PAST DUE     DUE         17          0        0
070589         0       10349    87400     100         52          88824     DUE         13          0        0
120077       356        4237    80393     100         53          82793       87627     11          1        1
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EMS-0511

FLEET SUMMARY

EMS-11

This is a management report that provides a brief, one-page summary of fleet assignment, costs and earnings by districts and areas.

Users:	Directors office, Administrator Maintenance and Equipment Division, Equipment Bureau.
Frequency:	Quarterly.

REPORT DETAILS

Current Inventory:	The report is broken down into major categories of equipment that includes the number of units in each area and a statewide total.
Fleet Costs:	Fleet operation and assigned costs by Area including a statewide total.
Usage:	Operation costs of the fleet.
Assigned:	Fixed costs (Insurance, depreciation, overhead) of the fleet.
Total Costs:	Total fleet costs.
Fleet Earnings:	Income generated by rental charges for miles/hours of usage plus hour assigned charges.
Usage:	Income derived for every mile/hour each unit is actually operated.
Assigned:	Income generated from monthly hours of assignment by unit.
Total Earnings:	Total income generated by the fleet.
Loss/Gain:	Current status of income vs. expenses.
Usage:	Loss or gain experienced. The rental income compared to actual costs of fuel, labor, parts, tires, etc.
Assigned:	Loss or gain experienced. The rental income compared to actual costs for depreciation, overhead and insurance.
Total YTD:	Total loss or gain for both usage and assigned categories.

MONTANA DEPARTMENT OF HIGHWAYS
FLEET SUMMARY
STATUS 2 UNITS

REPORT NO: EMS 11
RUN DATE: 12/08/89
PAGE: 1 OF 1

CURRENT	DISTRICT 1		DISTRICT 2		DISTRICT 3		DISTRICT 4			DISTRICT 5			FLEET
INVENTORY	MISSOULA	KALISPL	BUTTE	BOZEMAN	G FALLS	HAVRE	GLENDIVE	WLF PNT	MILS CT	BILLGS	LEWSTWN	HELENA	TOTALS
GVW CARS	3	1	4	0	4	0	4	0	0	4	0	1	21
PASSENGER CARS	9	3	12	3	12	4	10	2	3	11	2	0	71
SUBURBANS/VANS	20	17	37	8	30	7	14	7	7	22	10	8	187
PICKUPS	40	44	55	29	31	23	28	22	28	43	22	6	371
1 TONS	12	14	9	4	12	6	2	6	4	6	5	2	82
MEDIUM TRUCKS	50	51	81	39	45	29	23	23	36	49	29	16	471
LARGE TRUCKS	6	6	7	6	6	5	6	6	6	6	6	1	67
SPECIAL TRUCKS	4	5	12	6	9	8	6	5	5	8	7	3	78
MOTOR PATROLS	13	14	13	8	12	9	6	6	11	10	9	0	111
LOADERS	32	34	36	13	21	14	11	12	18	21	16	0	228
MISC. OFF ROAD	18	13	37	24	16	15	16	15	16	37	19	0	226
SPECIAL EQUIP	62	41	65	34	48	27	34	41	36	55	37	22	502
ASPHALT EQUIP	27	36	46	21	22	21	13	22	27	23	22	1	281
SNOW REMOVAL	123	127	205	109	130	75	69	73	94	119	88	6	1,218
TOTAL UNITS	419	406	619	304	398	243	242	240	291	414	272	66	3,914
FLEET COSTS													
USAGE	198,692	180,847	205,498	131,105	202,909	108,713	125,020	96,447	136,672	184,365	116,990	27,757	1715,015
ASSIGNED	271,413	222,311	280,835	206,196	239,184	156,334	143,801	133,510	174,536	229,534	165,042	26,642	2249,338
TOTAL COSTS	470,105	403,158	486,333	337,301	442,093	265,047	268,821	229,957	311,208	413,899	282,032	54,399	3964,353
FLEET EARNINGS													
USAGE	154,526	138,323	218,685	107,934	149,136	83,616	90,996	70,349	115,337	161,027	102,908	22,899	1415,736
ASSIGNED	281,198	258,994	375,585	198,563	257,130	160,552	152,271	139,769	179,614	251,503	170,417	42,189	2467,785
TOTAL EARNINGS	435,724	397,317	594,270	306,497	406,266	244,168	243,267	210,118	294,951	412,530	273,325	65,088	3883,521
LOSS/GAIN													
USAGE	-44,166	-42,524	13,187	-23,171	-53,773	-25,097	-34,024	-26,098	-21,335	-23,338	-14,082	-4,858	-299,279
ASSIGNED	9,785	36,683	94,750	-7,633	17,946	4,218	8,470	6,259	5,078	21,969	5,375	15,547	218,447
TOTAL YTD	-34,381	-5,841	107,937	-30,804	-35,827	-20,879	-25,554	-19,839	-16,257	-1,369	-8,707	10,689	-80,832

SHOP WORKLOAD

EMS-12

This report projects the estimates shop workload, based on fleet inventory, frequencies of repairs and average hours per repair.

Users:	Equipment Bureau
Frequency:	Annual, or as needed.

REPORT DETAIL

A detailed report is sorted for each shop by equipment class, providing repair information for each repair code.

Shop Work Load/Category Detail

Shop:	Appropriate area shop.
Category Desc.:	Description and number of units in a given category.
Repair Codes:	Listing of repair codes and a description of each.
Average Number Repairs/Unit:	The average number of repairs performed over the past 12 months for each repair code for each class of equipment.
Estimated Number Repairs:	The projected number of repairs based on past performance.
Average Hours/ Repair:	Average hours per repair for the past 12 months.
Total Hours/ Year	Estimated number of repairs times Average hours per repair equals estimated yearly repair hours.

MONTANA DEPARTMENT OF HIGHWAYS
SHOP WORK LOAD / STAFFING
DETAIL

REPORT #: EMS 12
RUN DATE: 11/06/89
PAGE: 6

SHOP: HELENA

	AVE. NO. REPAIRS/UNIT	EST. NO. REPAIRS	AVE HRS/ REPAIRS	TOTAL HRS/YR
MEDIUM TRUCKS (8)				
01 CLUTCH/TORQUE CONV	1.9	15	6.1	92
02 MAIN TRANSMISSION	1.3	10	8.8	88
03 AUX TRANS/TRANS CASE				
04 DRIVE SHAFT/U-JOINTS	.1	1	2.0	2
05 POWER TAKE OFF				
06 DIFFERENTIALS/AXLES	1.6	13	3.0	39
07 FINAL DRIVE/PLANET				
11 AIR INTAKE SYSTEM				
12 FUEL SYSTEM	.6	5	4.6	23
13 ENGINE REPAIR-MINOR	1.4	11	9.5	105
14 ENGINE REPAIR-MAJOR	3.1	25	1.5	38
15 COOLING SYSTEM	2.0	16	3.4	54
16 EXHAUST SYSTEM	1.1	9	2.4	22
21 HYDRAULIC SYSTEM	2.0	16	3.4	54
22 PLOWS				
23 OTHER				
31 SUSPENSION SYSTEM	.8	6	5.5	33
32 STEERING SYSTEM	1.0	8	3.0	24
33 BRAKE SYSTEM	3.1	25	4.0	100
34 WHEEL/HUB/BEARINGS				
35 INSTRUMENTS/GAUGES	.9	7	1.9	13
36 BODY REPAIR	2.3	18	3.6	65
41 IGNITION SYSTEM	.4	3	2.7	8
42 STARTING SYSTEM	1.4	11	1.7	19
43 CHARGING SYSTEM	.6	5	2.4	12
44 LIGHTING SYSTEM	1.9	15	2.9	44
51 AIR CONDITION/HEAT	.4	3	1.7	5
52 TIRES	2.1	17	2.8	48
53 ASPHALT EQUIPMENT				
54 MANUF/FABRICATE	1.9	15	12.1	182
55 PM LEVEL 1	2.9	23	26.2	603
55 PM LEVEL 2	.6	5	4.6	23
CATEGORY TOTAL	35.3	282	6.0	1692

Shop Work Load Area

EMS-12A

This report summarizes all area information from the EMS-12 report.

Users:	Equipment Bureau
Frequency:	Quarterly or as needed.

Report Details

This report is organized into two report formats. A detailed report as described, and a one-page summary.

Shop Workload Area Summary

Shop:	Report area shop.
Categories:	A listing of all equipment categories. For a list of categories see EMS-0541.
Actual Inventory:	Current fleet totals by category by area.
Ave. No. Repairs/Unit:	Average number of repairs performed by repair code.
Est. No. Repairs:	Estimated annual number of repairs.
Ave. Hrs./ Repairs:	Estimated average hours per repair.
Total Hrs/Yr:	Estimated annual repair hours.

Shop Work Load All Area Summary

Same information as described above except the report is by area instead of by category.

EMS-0513

MONTHLY MECHANIC PRODUCTION REPORT

EMS-13

This report details where payroll time is charged for the shop superintendent, working shop foreman, and mechanics.

Users:	Equipment Bureau
Frequency:	Monthly

Report Details

This report is generated monthly for each area. It formats information from individuals time sheets into selected categories. All information is in a percentage of total hours reported.

Employee Number:	Employee man number.
Direct:	Time spent in a directly repair activity.
Leave:	Time spent in a leave status.
Non-Reimbursable:	Time spent on accident damage.
A.W.P.:	Time spent on Authorized Work in Progress.
A.R.:	Time spent on Accounts Receivable (AR's).
Other:	All other account I.D. expenditures such as leave without pay, workers comp., etc.
For Maint:	Work performed for Maintenance and charged to the 4030 Account.
Account 4100 General Overhead:	Time spent in any or all of the five general overhead categories. See the detailed explanation at the bottom of the report.

```
                                                  MONTANA DEPARTMENT OF HIGHWAYS                                    REPORT #:    EMS 13
                                                MONTHLY MECHANIC PRODUCTION REPORT                                  RUN DATE: 11/06/89
                                                             MISSOULA                                                   PAGE:          1

          PERCENT OF REPORTED TIME BY CATEGORY  --  PERCENTS MAY NOT TOTAL TO 100% DUE TO ROUNDING.
MECHANIC
EMPLOYEE                    NON-                              FOR    -----ACCOUNT 4100 GENERAL OVERHEAD (** 4)-----
NUMBER   DIRECT   LEAVE    REIMBR   A.W.P.   A.R.     OTHER  MAINT.   PROJ    PROJ    PROJ    PROJ    PROJ    PROJ         TITLE
         (** 1)  (** 2)   (4260)   (0385)   (0398)   (** 3)  (4030)   0000    0001    0002    0003    0004    0005

  0152    72.39    9.82                                               17.79                                                MECHANIC

  0373    69.46    9.58                                               10.78           7.19    2.99                         MECHANIC

  3519    87.50                                                       12.50                                                MECHANIC

  3766    55.63   20.00                                                6.88   13.75   1.88    1.88                         FOREMAN

  4203    60.36   23.67                                               13.61    1.18   1.18                                 MECHANIC

  5264    44.38   35.63                                                8.13                  10.63    1.25                 MECHANIC

  5686    54.60    9.82                                                8.59                  20.25    6.75                 MECHANIC

  5823            11.52                                               88.48                                                SHOP SUPT




** 1:   DIRECT TIME INCLUDES EXP. ID. :  1007, 1101, 1102, 1150, 1151, 1153, 1154, 1155, 1157

** 2:    LEAVE TIME INCLUDES EXP. ID. :  1103, 1104, 1105, 1106, 1107, 1159, 1161, 1162

** 3:    OTHER TIME INCLUDES ALL OTHER ACCOUNTS AND EXP. ID.S NOT LISTED.

** 4:   OVERHEAD PROJECT CATEGORIES ARE:
          0000 - GENERAL OVERHEAD
          0002 - TRAVEL                                        0001 - SHOP SUPERVISION BY OTHERS
          0004 - TRAINING                                      0003 - WORK FOR OTHERS, EXCLUDING MAINTENANCE
                                                               0005 - MISCELLANEOUS REPAIRS
```

SHOP PERFORMANCE SUMMARY

EMS-14

This report is a one-page summary of EMS-07 information.

Users:	Equipment Bureau
Frequency:	Monthly

Report Details

A one-page summary of each shops performance for the past 12 months.

Shop:	Listing of all shops as well as statewide average.
% 4110 Direct:	Percent of shop hours coded to direct repairs. (Includes AWP's and AR's.)
% 4100 Overhead:	Percent of shop hours coded to overhead.
% Leave:	Percent of shop hours coded to leave.
NBR Units:	Current number of units assigned to each area.
Number of Repairs:	Number of repairs.
Repairs per Unit:	Average number of repairs per unit. (Number of repairs divided by the number of units.)
Avg. Hrs. Per RPR:	Average number of hours spent on each repair.
Avg. Hrs. Per PM:	Average hours per PM II performed.
# Repeat Repairs:	Number of repeat repairs.
% Repeat Repairs:	Percent of repairs that are repeats.
% Repairs Scheduled:	Percent of the repairs that are scheduled.
% Repairs Road Call:	Percent of repairs that are made away from the shop.

MONTANA DEPARTMENT OF HIGHWAYS
SHOP PERFORMANCE SUMMARY
PAST 12 MONTHS

REPORT #: EMS 14
RUN DATE: 11/06/89
PAGE: 1

SHOP	% 4110 DIRECT	% 4100 OVERHD	% LEAVE	NBR UNITS	NUMBER REPAIRS	REPAIRS PER UNIT	AVG HRS PER RPR	AVG HRS PER PM	# REPEAT REPAIRS	% REPEAT REPAIRS	% REPAIRS SCHEDULED	% REPAIRS ROAD CALL
MISSOULA	65	21	11	419	1591	3.8	6.1	18.2	130	8.1	86	12
KALISPELL	69	15	14	396	1493	3.8	6.0	18.6	98	6.5	84	25
BUTTE	69	18	12	494	1538	3.1	5.9	16.2	90	5.8	70	16
BOZEMAN	61	27	9	296	1325	4.5	5.0	15.2	100	7.5	80	19
GREAT FALLS	69	18	12	400	1536	3.8	5.6	17.9	103	6.7	82	18
HAVRE	58	24	16	251	1071	4.3	5.2	16.5	63	5.8	80	16
GLENDIVE	73	15	10	243	566	2.3	9.7	33.1	33	5.8	87	23
WOLF POINT	65	15	18	245	690	2.8	5.6	17.2	43	6.2	84	14
BILLINGS	66	18	11	415	1286	3.1	5.9	14.5	75	5.8	70	8
MILES CITY	65	23	10	294	1415	4.8	4.8	15.5	101	7.1	85	24
LEWISTOWN	60	24	13	278	661	2.4	6.3	16.7	43	6.5	86	11
HELENA	74	13	11	509	494	1.0	18.4	20.4	34	6.8	96	1
AVERAGE	66	19	12	353	1139	3.3	7.0	18.3	76	6.6	83	16

EMS-0515

PAST 12 MONTH FUEL USE SUMMARY

EMS-15

This report provides past 12 months fuel usage by subclass of all units in the fleet.

Users:	Equipment Bureau
Frequency:	Monthly microfiche

Report Details

Subcl:	Subclass from the equipment system. For a detailed description see the current rental rates.
Fuel:	The general type of fuel the subclass consumes. The class may be a mixture of fuel types so the predominate fuel type is used. (G) Gasoline (regular or unleaded), (D) Diesel, (P) Propane, (N) Generally no fuel use, (U) Unknown.
# Units:	The number of units in each subclass.
Months:	Number of gallons consumed and monthly costs for each month of the past 12 months.
Year:	Total gallons and cost for the past 12 months.

Summary Report

The same information as above plus fuel usage by fuel type and an average cost per gallon for the fuels consumed.

FIRST LINE IS GALLONS
SECOND LINE IS DOLLARS

MONTANA DEPARTMENT OF HIGHWAYS
12 MONTH FUEL USE SUMMARY
FOR YEAR ENDING 09/89

REPORT #: EMS 15
RUN DATE: 11/06/89

SUBCL	FUEL	# UNITS	SEP	AUG	JUL	JUN	MAY	APR	MAR	FEB	JAN	DEC	NOV	OCT	YEAR
230	D	17	3156	3461	1446	3800	1642	225	0	32	279	2508	3643	2780	22972
			2511	2817	1158	3013	1244	175	0	26	178	1756	2615	2094	17587
251	G	19	52	160	34	364	528	458	1388	1382	812	671	411	272	6532
			49	151	30	312	442	363	1078	1089	636	557	349	231	5287
252	D	23	96	29	18	405	526	1158	3369	2758	2130	1385	499	422	12795
			66	19	12	276	363	731	2066	1628	1262	816	301	256	7796
271	D	48	4992	6410	1538	5301	6725	14999	19520	18530	20993	19639	4172	2794	125613
			3411	4369	1045	3677	4570	9510	11857	10959	12379	11581	2507	1731	77596
272	D	8	114	0	25	149	330	1964	2133	3103	2238	637	281	32	11006
			78	0	18	99	220	1236	1269	1858	1324	383	170	19	6674
292	D	11	2168	2090	775	1028	335	185	0	76	80	1148	1540	1353	10778
			1509	1461	548	710	238	125	0	44	47	641	897	825	7045
293	D	12	3456	3462	1037	3433	2654	1370	2873	1693	1816	3843	1602	2452	29691
			2364	2334	710	2361	1797	857	1722	1000	1085	2214	949	1437	18833
294	D	58	10147	17551	4121	11464	7442	16148	22041	26804	29945	16056	6371	5948	174038
			6941	11853	2836	7966	5001	10198	13367	15882	17893	9303	3789	3522	108551
301	D	16	1114	1873	344	1194	761	469	698	685	603	682	534	750	9707
			747	1268	230	821	521	299	423	395	348	398	304	445	6199
302	D	100	6776	12482	4081	9376	5056	3579	3735	4264	5192	5702	3992	4994	69229
			4598	8476	2765	6464	3435	2238	2234	2511	3105	3279	2342	2949	44396
303	D	2	97	273	101	327	0	308	488	583	515	235	12	0	2939
			68	190	68	226	0	192	297	350	306	145	10	0	1852
305	D	12	1020	2119	346	1197	958	1230	1656	3225	3053	1480	172	693	17149
			706	1464	242	841	662	791	1001	1939	1832	867	102	419	10866
311	G	56	713	1078	271	299	77	36	27	0	4	107	60	165	2837
			633	974	234	251	59	25	21	0	3	84	49	127	2460
312	G	18	177	590	242	122	18	5	0	0	0	76	22	49	1301
			120	403	166	86	12	3	0	0	0	44	15	28	877
314	G	14	326	347	18	170	53	0	0	0	0	57	0	10	981
			299	321	15	160	35	0	0	0	0	47	0	8	885
322	D	35	218	318	233	438	406	395	527	441	368	627	419	364	4754
			149	218	189	312	284	262	321	259	223	392	268	235	3112
323	D	131	3063	3555	1409	6333	4066	4094	4440	5817	5102	6720	3554	3387	51540
			2061	2499	952	4448	2754	2601	2686	3498	3059	3996	2158	2094	32806
324	D	59	2799	5050	1821	5894	3991	3399	4560	4784	4394	5220	2073	2070	46055
			1916	3483	1265	4095	2701	2135	2749	2822	2585	3022	1245	1234	29252

Downtime Summary

EMS-016

This is an exception report that details downtime in excess of 5% for the current month and past 12 months. This report is used as a quick review of current month downtime and provides a comparison to that experienced during the past 12 months.

Users:	Division Administrator and Maintenance Chiefs
Frequency:	Monthly

Report Details

Equip No:	Unit number experiencing downtime exceeding predetermined percentage.
Last Odometer/ Hour reported:	Last reported odometer or EMS accumulated hours.
Current:	Current month downtime in two categories: 5-10% and over 10%.
Past 12 mo:	Downtime for the past 12 months. There is no percentage restriction. This information is used as a comparison to see if the current downtime has been a continual problem.

MONTANA DEPARTMENT OF HIGHWAYS
HIGH DOWNTIME SUMMARY
DIVISION: MILES CITY

EQUIP NUMBER	LAST REPORTED HOUR/ODOMETER	**** CURRENT MONTH DOWNTIME 5-10%	OVER 10% ****	PAST 12 MONTHS DOWNTIME %
030222	80450	7		2
070538	115715		12	1
070581	112648		31	2
070615	49965		26	2
070650	89685	7		
070712	59199	7		
080068	47192	7		
190518	154343		17	5
190623	66541		17	4
190630	74928		17	3
190739	63362		26	6
190770	53134	7		2
290044	63911		26	5
290047	75063	7		3
290065	62030		31	4
320426	4218		26	2
320436	1982	7		1
320696	3795	7		
320762	6653	7		1
320924	11731		21	9
330731	3198		21	5
330732	2920		35	8
340035	722	7		2
390061	4851	7		1
630456	4456		12	4

UNACCOMPLISHED LEVEL II PM REPORT

EMS-017

This report estimates the required hours of level 2 service work for each shop and provides a comparison between what was estimated and what was accomplished.

Users:	Equipment Bureau
Frequency:	Annually or as needed

Report Details

Area:	The Area for which the report is being issued will appear at the top of the page.
Class:	Class of vehicles or equipment.
Description:	A basic description of the class.
Total miles/ hours:	Total miles or hours of actual use during the reporting period.
No. PM's Needed:	The number of PM's that should have been performed (miles traveled divided by PM interval = number of PM's needed).
Estimated Hours Each PM:	Estimated hours required to perform a complete level 2 service as outlined in the PM program portion of this manual.
Total Est. PM Hours Required:	Estimated hours required (services required times the hours per service).
Actual PM Hours:	Actual PM II hours performed.
Unaccomplished PM Hours:	Unaccomplished PM II hours. This is the difference between estimated PM II hours and actual PM II hours performed.

MONTANA DEPARTMENT OF HIGHWAYS
UNACCOMPLISHED LEVEL II PM REPORT
DIVISION: BUTTE

REPORT #: EMS 17
RUN DATE: 11/06/87

CLASS	DESCRIPTION	TOTAL MILES/HOURS	NUMBER OF PM'S NEEDED	ESTIMATED HOURS EACH PM	TOTAL EST. PM HOURS REQUIRED	ACTUAL PM HOURS	UNACCOMPLISHED PM HOURS
00	PURSUIT CARS	3,965		7.5			
02	UTILITY VEH	1,326		12.0			
03	SUBURBAN	9,463		12.0			
06	COMPACTS	7,155		7.5			
07	PICKUP 1/2 T	31,219	1	12.0	12.0	38	
08	PICKUP 3/4 T	5,802		12.0			
09	1 TON TRUCK	3,799		12.0			
10	6 PSNGR VEH	926		12.0			
12	VANS	3,973		12.0			
19	DUMP TRUCK	21,078	1	28.0	28.0	20	8.0
21	TRUCK W/5TH	354		28.0			
23	PAINT STRPRS	723		28.0			
25	TRUCK 4X4 SM			28.0			
27	DUMP D 250HP	6,074		28.0			
29	TANDEM DSL	4,326		28.0			
30	MOTOR PATROL	417		35.5		16	
31	ROLLERS ALL	40		8.0			
32	LOADERS ALL	466		35.5			
33	TRACTOR MWRS	164		12.5			
34	SPECIAL EQP			28.0			
35	CRAWLER DOZR	8		35.5			
36	MISC.EQUIP						
37	PULVERIZERS						
39	DRILLING EQ			35.0			
41	AIR CMPRSRS	72				3	

SHOP STAFFING REPORT

EMS-018

This report details staffing requirements based on actual payroll hours and requirements listed under the report details.

Users:	Equipment Bureau
Frequency:	Monthly

Report Details

Shop:	Area shop
Actual Repair Hours:	Actual time slip direct repair hours.
# FTE:	Number of FTE's needed are the total hours expended for this category divided by 2080 hours.
General Overhead:	Account 4100 project numbers are: 0000 general overhead, 0001 shop supervision by others, 0002 travel, and 0004 training.
# FTE:	Number of FTE's needed are the total hours expended for these categories divided by 2080 hours.
Work for Others:	Work performed for others (Account 4030) or construction project number 0003 or miscellaneous repairs project number 0005.
# FTE:	Number of FTE's needed are the total hours expended for these categories divided by 2080 hours.
Unaccompl LVL II PM Service:	Hours of level 2 service work that was not accomplished. (Data from EMS 17 Report.)

# FTE:	Number of FTE's needed are the total estimated hours required less those accomplished divided by 2080 hours.
Leave Time:	Hours of authorized leave.
# FTE:	Number of FTE's needed are the total hours expended for leave divided by 2080 hours.
Total FTE Required:	Total FTE's are those needed for all listed categories.
Actual FTE Assigned:	Actual number of mechanics and working shop foremen assigned to each shop.

JH:1:by:lrk:21E-26

REPORT #: EMS 19
RUN DATE: 11/06/83

MONTANA DEPARTMENT OF HIGHWAYS
SHOP STAFFING REPORT
PAST 12 MONTHS

SHOP	REPAIR HOURS	# FTE	GENERAL OVERHEAD	# FTE	WORK FOR OTHERS	# FTE	UNACCOMPL LVL II PM SERVICE	# FTE	LEAVE TIME	# FTE	TOTAL FTE REQUIRED	MECH / WSF FTE'S AUTHORIZED
MISSOULA	8124	3.9	4357	2.1	677	.3	730	.4	1452	.7	7.4	7.0
KALISPELL	6987	3.4	3737	1.8	230	.1	359	.2	1443	.7	6.2	6.0
BUTTE	8779	4.2	4607	2.2	791	.4	419	.2	1576	.8	7.8	7.0
BOZEMAN	5813	2.8	4021	1.9	506	.2	175	.1	903	.4	5.4	5.0
GREAT FALLS	7254	3.5	5013	2.4	318	.2	357	.2	1267	.6	6.9	6.0
HAVRE	6206	3.0	4156	2.0	1148	.6	110	.1	1772	.9	6.6	5.0
GLENDIVE	6046	2.9	3004	1.4	417	.2	91		891	.4	4.9	4.0
WOLF POINT	4150	2.0	2950	1.4	854	.4	62		1156	.6	4.4	4.0
BILLINGS	6530	3.1	4108	2.0	624	.3	431	.2	1134	.5	6.1	6.0
MILES CITY	5495	2.6	4163	2.0	612	.3			918	.4	5.3	5.0
LEWISTOWN	5027	2.4	4051	1.9	550	.3	67		1139	.5	5.1	4.0
HELENA	9737	4.7	1896	.9	293	.1			1504	.7	6.4	7.0
		38.5		22.0		3.4		1.4		7.2	72.5	66.0

GENERAL OVERHEAD INCLUDES ACCOUNT 4100 PROJECTS 0000, 0001, 0002 & 0004

WORK FOR OTHERS INCLUDES ACCOUNT 4030 AND ACCOUNT 4100 PROJECTS 0003 & 0005

HIGHWAY EQUIPMENT INVENTORY MANAGEMENT REPORT

EMS-019/019A

This report provides inventory information for each unit in the fleet. A statewide report is provided for the Equipment Bureau (EMS-019) and an additional report is produced by Maintenance Area (EMS-019A) and sent to each Maintenance Chief. EMS-020 is the same as 019A except it is for all inactive equipment.

Users:	Equipment Bureau (EMS 019), Maintenance Chiefs (EMS 019A).
Frequency:	Monthly.

REPORT DETAIL

Resp Center:	The responsibility center to which the unit is assigned (see. Accounting's coding manual for responsibility centers)
Equip No.:	The unit number for each piece of equipment on inventory.
Make and MFR Model:	Information concerning the make and manufacturer of the unit.
YR:	The year of the unit.
Serial No.:	Serial number of the unit.
CC:	Indicates a credit card has been issued for the unit 2, 3, 4, etc. denotes number of duplicate cards issued.
Purchase Date:	Date of the purchase order under which the unit was purchased.
ACT 1500 value:	Actual purchase price of the unit.
Year to date MI:	Year to date miles/hours reported for current Fiscal Year usage.
Current Odometer:	Current total miles/hours.
LF YD:	Estimated life of a unit.
Warranty Date:	The date the unit was put into service which is also when the warranty period begins.
STAT:	Status of the unit. 1 - P.O. has been issued and the unit(s) ordered. 2 - Active fleet unit. (Unit(s) have been paid for.) 3 - Units awaiting disposal. (Resp. 089593 Area 7093) 4 - Units transferred to Surplus Property (SP3) and proper accounting journals processed. Vehicle Class Number and the number of active units in that class appear after each class break.

DATA AS OF END OF OCT 1989

MONTANA DEPARTMENT OF HIGHWAYS
ACTIVE HIGHWAY EQUIPMENT INVENTORY MANAGEMENT REPORT

RPT NO: EMS-19
RUN DATE: 11/06/89
PAGE NO: 5

RESP CENTER	EQUIP. NO.	MAKE AND MFR MODEL	YR	SERIAL NO.		CC	PURCH DATE	ACT 1500 VALUE	YEAR TO DATE MI	CURRENT ODOMETR	LF YR	WARRANTY DATE	STAT
21 022132	060132	CHEVROLET CELEBRITY 4 DOOR	85	1G1AW19R9G6222465		*	03/86	8295.00	3004	58721	05	05/07/86	2
51 025132	060133	CHEVROLET CELEBRITY 4 DOOR	86	1G1AW19R7G6226207		*	03/86	8295.00	2492	41335	05	05/07/86	2
42 034220	060134	CHEVROLET CELEBRITY 4 DOOR	86	1G1AW19R9G6223843		2	03/86	8295.00	577	54463	05	05/14/86	2
12 031220	060135	CHEVROLET CELEBRITY 4 DOOR	86	1G1AW19R7G6221492		*	03/86	8295.00	3657	54422	05	05/05/86	2
11 031120	060136	CHEVROLET CELEBRITY 4 DOOR	86	1G1AW19R7G6226465		*	03/86	8295.00	4723	42117	05	04/24/86	2
22 022132	060137	CHEVROLET CELEBRITY 4 DOOR	86	1G1AW19R0G6226467		*	03/86	8295.00	7574	49818	05	06/08/88	2
51 025130	060138	CHEVROLET CELEBRITY 4 DOOR	86	1G1AW19R2G6220279		*	03/86	8295.00	2609	71899	05	05/12/89	2
21 022132	060139	CHEVROLET CELEBRITY 4 DOOR	87	1G1AW51R5H6201388	1H6201388	*	02/87	9162.00	3712	64278	05	03/30/87	2
21 022131	060140	CHEVROLET CELEBRITY 4 DOOR	87	1G1AW51R0H6202111	1H6202111	*	02/87	9162.00	4365	63059	05	03/24/87	2
41 024131	060141	CHEVROLET CELEBRITY 4 DOOR	87	1G1AW51R2H6202112	1H6202112	*	02/87	9162.00	4508	45989	05	03/26/87	2
31 023132	060142	CHEVROLET CELEBRITY 4 DOOR	87	1G1AW51RXH6202715		*	02/87	9162.00	3275	44517	05	04/21/87	2
41 024131	060143	CHEVROLET CELEBRITY 4 DOOR	87	1C1AW5146H6202601		*	02/87	9162.00	1825	56928	05	03/26/87	2
51 025130	060144	CHEVROLET CELEBRITY 4 DOOR	87	1G1AW51R5H6209345		*	02/87	9162.00	2068	18422	05	05/12/89	2
11 021132	060145	CHEVROLET CELEBRITY 4 DOOR	87	1G1AW51R8H6207699		*	02/87	9162.00	392	37183	05	04/14/87	2
31 023132	060146	CHEVROLET CELEBRITY 4 DOOR	87	1G1AW51RXH6202274		*	02/87	9162.00	3491	41153	05	04/21/87	2
11 021134	060147	CHEVROLET CELEBRITY 4 DOOR	88	1G1AW51W7J6200996			02/88	9953.90	2408	27658	05	03/22/88	2
51 025131	060148	CHEVROLET CELEBRITY 4 DOOR	88	1G1AW51W7J6203123			02/88	9953.90	3380	26360	05	03/22/88	2
21 022131	060149	CHEVROLET CELEBRITY 4 DOOR	88	1G1AW51W4J6204097			02/88	9953.90	6986	57477	05	03/29/88	2
31 023131	060150	CHEVROLET CELEBRITY 4 DOOR	88	1G1AW51W6J6207695			02/88	9953.90	4313	27595	05	04/14/88	2
21 032120	060151	CHEVROLET CELEBRITY 4 DOOR	88	1G1AW51R0J6205354			02/88	9068.90	2580	29400	05	03/28/88	2
22 032220	060152	CHEVROLET CELEBRITY 4 DOOR	88	1G1AW51R5J6205639			02/88	9068.90	4284	28330	05	04/01/88	2
53 035320	060153	CHEVROLET CELEBRITY 4 DOOR	88	1G1AW51R8J6203139			02/88	9068.90	3956	29556	05	04/01/88	2
21 022131	060154	CHEVROLET CELEBRITY 4 DOOR	88	1G1AW51R1J6204116			02/88	9068.90	4991	30448	05	03/28/88	2
51 085140	060155	CHEVROLET CELEBRITY 4 DOOR	88	1G1AW51R6J6202216			02/88	9068.90	2411	22557	05	04/01/89	2
41 034120	060156	CHEVROLET CELEBRITY 4 DOOR	88	1G1AW51R0J6202163			02/88	9068.90	3446	20080	05	03/30/88	2
43 034320	060157	CHEVROLET CELEBRITY 4 DOOR	88	1G1AW51R5J6204426			02/88	9068.90	2946	25571	05	03/31/88	2
41 024132	060158	CHEVROLET CELEBRITY 4 DOOR	88	1G1AW51R6J6209568			02/88	9068.90	2637	30567	05	04/21/88	2
12 021134	060159	CHEVROLET CELEBRITY 4 DOOR	88	1G1AW51R4J6209603			02/88	9068.90	3397	23798	05	04/01/88	2
11 021131	060160	CHEVROLET CELEBRITY 4 DOOR	88	1G1AW51R5J6251519			02/88	9114.00	1540	22197	05	06/14/88	2.
11 031120	060161	CHEVROLET CELEBRITY 4 DOOR	89	1G1AW51R6K6212648			02/89	9709.00	486	5032	05	03/16/89	2
31 023131	060162	CHEVROLET CELEBRITY 4 DOOR	89	1G1AW51R3K6212834			02/89	9709.00	5135	12719	05	03/16/89	2
41 024131	060163	CHEVROLET CELEBRITY 4 DOOR	89	1G1AW51R9K6206231			02/89	9709.00	2265	9165	05	03/16/89	2
42 034220	060164	CHEVROLET CELEBRITY 4 DOOR	89	1G1AW51R5K6212530			02/89	9709.00	2208	8948	05	03/15/89	2
51 025132	060165	CHEVROLET CELEBRITY 4 DOOR	89	QG1AW51RPK6212533			02/89	9709.00	6573	13906	05	03/16/89	2
41 024132	060166	CHEVROLET CELEBRITY 4 DOOR	89	1G1AW51R7K6213484			02/89	9709.00	5213	16210	05	03/15/89	2
32 033220	060167	CHEVROLET CELEBRITY 4 DOOR	89	1G1AW51RXK6213107			02/89	9709.00	5264	14014	05	03/22/89	2
51 025131	060168	CHEVROLET CELEBRITY 4 DOOR	89	1G1AW51R8K6212246			02/89	9709.00	7147	17734	05	03/22/89	2
31 023131	060169	CHEVROLET CELEBRITY 4 DOOR	89	1G1AW51RXK62439			02/89	9709.00	3785	6695	05	07/11/89	2

VEHICLE CLASS 06 NUMBER = 71

RESP CENTER	EQUIP. NO.	MAKE AND MFR MODEL	YR	SERIAL NO.		CC	PURCH DATE	ACT 1500 VALUE	YEAR TO DATE MI	CURRENT ODOMETR	LF YR	WARRANTY DATE	STAT
70 089593	071242	DODGE 1/2 TON PICKUP D100	75	D14BB5S119728		*	06/75	3267.15	0	87358	08	10/23/89	2
12 021134	071244	DODGE 1/2 TON PICKUP D100	75	D14BB5S119734			06/75	3267.15	546	84267	08	04/28/86	2
21 082140	071257	DODGE 1/2 TON PICKUP D100	75	D14BB5S119705			07/75	3267.15	2123	100240	08	06/25/86	2
21 032120	071276	DODGE 1/2 TON PICKUP D100	76	D14BB6S300370			05/76	3788.50	2384	85686	08	/ /	2
12 021134	071284	DODGE 1/2 TON PICKUP D100	76	D14BB6S301425			05/76	3788.50	1051	116086	08	07/20/98	2
12 021134	071286	DODGE 1/2 TON PICKUP D100	76	D14BB6S301412			05/76	3788.50	1160	127482	08	/ /	2

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                                   MONTANA DEPARTMENT   HIGHWAYS                                           RPT NO:        EMS-19-A
 ATA AS OF    END OF OCT 1989   ACTIVE HIGHWAY EQUIPME   INVENTORY MANAGEMENT REPORT                       RUN DAT        11/06/89
                                       MISSOULA DIVISION                                                   PAGE NO:           1

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   RESP   | EQUIP.|      MAKE AND MFR MODEL       |YR|          SERIAL NO.              |CC|PURCH| ACT 1500 |YEAR TO|CURRENT|LF|WARRANTY|ST
  CENTER  |  NO.  |                               |  |                                  |  |DATE |  VALUE   |DATE MI|ODOMETR|YR|  DATE  |AT
----------|-------|-------------------------------|--|----------------------------------|--|-----|----------|-------|-------|--|--------|--
11 017009| 000202|CHEVROLET CELEBRITY 4 DOOR     |87|1G1AW51W4H6202005                 | 2|02/87|   9845.00|   8300|  84200|05|04/30/87| 2
11 017009| 000205|CHEVROLET CELEBRITY 4 DOOR     |88|1G1AW51W0J6205702                 | 2|02/88|   9953.90|   6840|  44650|05|04/29/88| 2
11 017009| 000214|CHEVROLET CELEBRITY 4 DOOR     |89|1G1AW51W7K6215287                 |  |02/89|  10513.00|  10550|  21450|05|04/11/89| 2

   VEHICLE CLASS 00  NUMBER =    3


11 021134| 021012|GMC JIMMY 4X2                  |82|5DC18D7CF513633                   | *|03/82|   8135.00|    523|  75781|08|  /  /  | 2
11 021132| 021022|GMC JIMMY 4X2                  |83|1G5CS18B1D0520000                 | *|06/83|   8714.11|      6| 118460|08|  /  /  | 2
11 021134| 021024|GMC JIMMY 4X2                  |83|1G5CS18B2D0519681                 | *|06/83|   8714.11|    300|  76460|08|  /  /  | 2
11 021134| 021034|GMC JIMMY 4X2                  |84|1G5CS18B3E0521814                 | *|03/84|   9628.00|   4200|  83800|08|05/18/84| 2
11 021134| 021039|CHEVY BLAZER 4X2               |85|1G8GS18B6F8171956 A051204TAF      |  |12/84|   9892.00|   1488|  56988|06|03/28/85| 2
11 021134| 021040|CHEVY BLAZER 4X2               |85|1G8CS18B9F8173636 A051204TAF      |  |02/84|   9892.00|   3307|  75500|06|03/28/85| 2
11 021133| 021041|CHEVY BLAZER 4X2               |85|1G8CS18B0F8179468 A051204TAF      | 2|12/84|   9892.00|   1975|  57733|06|04/11/85| 2
11 021134| 021042|CHEVY BLAZER 4X2               |85|1G8CS18B0F8181771 A051214TAF      | 1|12/84|   9892.00|    864|  84675|06|04/17/85| 2
11 021134| 021052|CHEV BLAZER 4X2                |88|1GNCS18RXJ0146933                 | *|02/88|  11918.00|   3290|  22107|06|06/23/88| 2
11 021134| 021053|CHEV BLAZER 4X2                |88|1GNCS18R2J0146859                 | *|02/88|  11918.00|   4990|  31436|06|06/23/88| 2

   VEHICLE CLASS 02  NUMBER =   10


11 021134| 030225|GMC SUBURBAN TC 20906          |85|1G5GC26M4FF528696                 | *|12/84|  12316.41|   2922|  56223|08|08/09/85| 2
11 021134| 030247|CHEVROLET SUBURBAN             |86|1G8GC26M0GF165964                 | *|03/86|  13041.57|   2733|  46320|08|05/21/86| 2
11 021134| 030248|CHEVROLET SUBURBAN             |86|1G8GC26M4GF166017                 | *|03/85|  13041.58|   3318|  37690|08|05/21/86| 2
11 021134| 030265|CHEVROLET SURBURBAN CR20906    |89|1GNGR26K3KF156453                 |  |02/89|  14768.38|   2040|   6078|05|05/17/89| 2

   VEHICLE CLASS 03  NUMBER =    4


11 021130| 060093|FORD FAIRMONT 4 DR SEDAN       |82|ABP21B5CK165881                   | *|04/82|   7087.20|   2422|  90591|05|  /  /  | 2
11 021130| 060107|OLDS OMEGA 4/DR SEDAN          |84|1G3AB69X3EW338420                 | *|03/84|   7004.25|   2189|  92502|05|06/08/89| 2
11 021131| 060120|CHEVROLET CITATION 4/DR        |85|1G1XX68X1FW138448 A050212CDB      | *|12/84|   7165.00|   3364|  73937|05|04/04/85| 2
11 021132| 060127|CHEVROLET CITATION 4/DR        |85|1G1XX68X3FW140587                 | *|12/84|   7165.00|   8000| 103800|05|04/11/85| 2
11 031120| 060136|CHEVROLET CELEBRITY 4 DOOR     |86|1G1AW19R7G6226465                 | *|03/86|   8295.00|   4723|  42117|05|04/24/86| 2
11 021132| 060145|CHEVROLET CELEBRITY 4 DOOR     |87|1G1AW51R8H6207699                 | *|02/87|   9162.00|    392|  37183|05|04/14/87| 2
11 021134| 060147|CHEVROLET CELEBRITY 4 DOOR     |88|1G1AW51W7J6200996                 |  |02/88|   9953.90|   2408|  27658|05|03/22/88| 2
11 021131| 060160|CHEVROLET CELEBRITY 4 DOOR     |88|1G1AW51R5J6251519                 |  |02/88|   9114.00|   1540|  22197|05|06/14/88| 2
11 031120| 060161|CHEVROLET CELEBRITY 4 DOOR     |89|1G1AW51R6K6212648                 |  |02/89|   9709.00|    486|   5032|05|03/16/89| 2

   VEHICLE CLASS 06  NUMBER =    9


11 021134| 071415|DODGE SWEPTSIDE SWB D150       |80|D14JNAS142807                     | *|04/80|   5355.69|   1128|  90412|08|  /  /  | 2
11 021134| 071431|DODGE SWEPTSIDE SWB D150       |80|D14JNAS142803                     | *|05/80|   5355.69|      0|  94349|08|08/02/83| 2
11 031120| 071445|DODGE SWEPTSIDE LWB D150       |80|D14JNAS146366                     |  |05/80|   5371.86|    894| 159020|08|  /  /  | 2
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HIGHWAY EQUIPMENT OPERATING COST REPORT

EMS-021

This report summarizes, by class and sub-class all costs, earnings, mileage and fuel consumption for the current month, year-to-date and life. The report is produced monthly on microfische and quarterly on hard copy.

User: Equipment Bureau

Frequency: Microfische monthly and hard copy quarterly.

REPORT DETAIL

Class & Sub-Class: Appears at the top of the data sheet along with the total number of units for that class/sub-class. All other data appears in the current month, year-to-date and life format.

#1500: Purchase price of a unit.

#1502: Depreciation applicable to each unit.

Miles Operated: Total class miles/hours for the periods listed.

Gallons of Fuel: Total class gallons of fuel reported for the periods listed.

Miles per gallon: Miles/hours per gallon of fuel. (Miles/hours divided by fuel usage reported.)

Actual Costs: Operating costs by class/sub-class separated into the appropriate variable or fixed category.

Variable Costs: Lubrication, gasoline, labor, tires, parts, etc. These are direct charges to a vehicle or piece of equipment.

Fixed Costs: Insurance, indirect and non-reimbursable charges. These are overhead charges and will be charged even if the fleet is not used.

Grand Totals Costs: Total of all usage and assigned costs.

Usage Earnings: Earnings generated from the usage portion of the rental rates. (Actual miles/hour used times usage rental rate.)

REPORT DETAIL - Continued

Assigned Earnings:	Earnings generated the assigned portion of the rental rates. (See current rental rates.)
Equipment Total Earnings:	Total income received from rental rates.
Usage Gain/Loss:	Difference between usage earnings and usage costs.
Assign Gain/Loss:	Difference between assigned earnings and assigned costs.
Cost Per Mile:	Same data as detailed above but in a cost per mile/hour operated format.

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*****     THE CLASS & SUB-CLASS # IS 191     TOTAL NUMBER OF UNITS = 207   DUMP TRK 4X2 G

  #1500 VALUE3537505.33      CURRENT        YEAR TO      PURCHASE DATE      CURRENT          YEAR TO        PURCHASE DATE
  #1502 VALUE2959088.02                      DATE         TO PRESENT                          DATE           TO PRESENT

 MILEAGE OPERATED           136146.0       2099184.0     27867010.0
 GALLONS OF FUEL             34483.0        527437.5      6854862.7
 MILES PER GALLON                3.9             3.9            4.0
                               ******    ACTUAL   COSTS   ******              ******  COST  PER  MILE   ******

 LUBRICATION & GASOLINE      31276.         429191.       6249818.           0.229           0.204           0.224
 LABOR                       25397.         241923.       2259618.           0.186           0.115           0.081
 TIRES, PARTS, MISC          16624.         182639.       1642170.           0.122           0.087           0.058
    TOTAL USAGE COST         73298.         853754.        151608.           0.538           0.406           0.005

 INS. INDRCT. NON-REIMB      26090.         353107.       3418177.           0.191           0.168           0.122
 DEPRECIATION                 9747.         159962.       2959088.           0.071           0.076           0.106
    TOTAL ASSIGN COST        35837.         513070.       6377265.           0.263           0.244           0.228

 GRAND TOTAL COST           109136.        1366825.       6528873.           0.801           0.651           0.234

 USAGE  EARNINGS             55140.         849321.        589363.           0.405           0.404           0.021
 ASSIGN EARNINGS             68908.         631190.       5716793.           0.506           0.300           0.205

 EQUIP. TOTAL EARNINGS      124048.        1480512.       6306156.           0.911           0.705           0.226

 USAGE  GAIN / LOSS          18158.-          4433.-       437755.           0.133-          0.002-          0.015
 ASSIGN GAIN / LOSS          33071.         118120.        660472.-          0.242           0.056           0.023-

*****     THE CLASS & SUB-CLASS # IS 192     TOTAL NUMBER OF UNITS = 226   DUMP TRK 4X2 D

  #1500 VALUE6918264.43      CURRENT        YEAR TO      PURCHASE DATE      CURRENT          YEAR TO        PURCHASE DATE
  #1502 VALUE2261817.50                      DATE         TO PRESENT                          DATE           TO PRESENT

 MILEAGE OPERATED           220897.0       3258353.0     11058203.0
 GALLONS OF FUEL             31800.0        486606.9      1712427.2
 MILES PER GALLON                6.9             6.6            6.4
                               ******    ACTUAL   COSTS   ******              ******  COST  PER  MILE   ******

 LUBRICATION & GASOLINE      22107.         297279.       1215280.           0.100           0.091           0.109
 LABOR                       21957.         197619.        566173.           0.099           0.060           0.051
 TIRES, PARTS, MISC          13207.         187044.        495105.           0.059           0.057           0.044
    TOTAL USAGE COST         57272.         681942.       2276560.           0.259           0.209           0.205

 INS. INDPCT. NON-REIMB      39217.         445198.       1368591.           0.177           0.136           0.123
 DEPRECIATION                57652.         613053.       2261817.           0.260           0.188           0.204
    TOTAL ASSIGN COST        96870.        1058252.       3630409.           0.438           0.324           0.328

 GRAND TOTAL COST           154142.        1740194.       5906969.           0.697           0.534           0.534

 USAGE  EARNINGS             55002.         813102.       2830653.           0.248           0.249           0.255
 ASSIGN EARNINGS            123322.        1001310.       3097437.           0.558           0.307           0.280

 EQUIP. TOTAL EARNINGS      178324.        1814413.       5928090.           0.807           0.556           0.536

 USAGE  GAIN / LOSS           2270.-        131159.        554092.           0.010-          0.040           0.050
 ASSIGN GAIN / LOSS          26452.          56941.-       532971.-          0.119           0.017-          0.048-
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EQUIPMENT USAGE FOR THE PAST 12 MONTHS

EMS-022

This reports details usage by unit, by class, for the past 12 consecutive months including the total class miles/hours by month and year-to-date.

User:	Equipment Bureau.
Frequency:	Monthly.

REPORT DETAIL

Equipment No.:	Miles/hours by month for the past 12 consecutive months plus year-to-date totals.
Class Total:	Appears below each class and reflects class totals.

STATE OF MONTANA - DEPARTMENT OF HIGHWAYS

Highway Equipment Monthly Usage For The Past 12 Months

EB 021S

EQUIP. NO.	APR	MAY	JUN	JUL	- - - -	YTD
00146	1,801	1,525	3,509	1,184		19,390
00147	960	1,080	1,596	1,250		18,540
00170	450	1,400	687	1,840		19,600

Class-Subclass: 000 Number Units: 21 GVW Class

	APR	MAY	JUN	JUL	- - - -	YTD
	48,605	37,854	51,996	20,809		441,815
Ave. MPW	2,314	1,802	2,476	990		21,038

JH:1:lrk:21E-31

SERVICE AND PM INTERVALS

CLASS	PM-I Interval	PM-II Interval
00,01,06	5,000 miles	20,000 miles
02,03,07-16	3,000 miles	20,000 miles
18-22 (Gas)	3,000 miles	20,000 miles
24-26	3,000 miles	20,000 miles
19,27-29 (Diesel)	3,000 miles	20,000 miles
30,32,42	200 hours	2,000 hours
31,33, 34-41,54	100 hours	500 hours

EXCEPTION CRITERIA

PM's DUE:	When within 80% of designated intervals.
PM's PAST DUE:	When designated intervals are exceeded.

APPLIES TO:

Report EMS-08	PM Program Summary
Report EMS-10	Section Equipment Summary

CLASS EXCEPTION CRITERIA EXAMPLE

Average Miles/Hours:	Low - Less than 80% of average High - More than 150% of average
Availability:	Low - Less than 80% of average High - More than 110% of average
Utilization:	Low - Less than 80% of average High - More than 150% of average
Operating Costs:	Low - Less than 80% of average High - More than 120% of average
Fuel Use:	Low - Less than 80% of average High - More than 100% of average
Add Oil:	Low - Less than 80% of average High - More than 110% of average
Applies To:	Report EMS-04 Substandard Unit Report Report EMS-09 Fuel and Oil Summary

For actual class exceptions review CICS display screen HI87.

EMS-0541

GENERAL CATEGORIES OF VEHICLES AND EQUIPMENT

GENERAL CATEGORY	CLASSES CONSOLODATED INTO GENERAL CATEGORIES
G.V.W. Pursuit	00 Passenger Cars
Passenger Cars	06 Compact
Suburbans/Vans	02 Bronco Utility Vehicles
	03 Suburbans
	10 6 pass units
	12 Van, All
Pickups, All Types	07 P.U. 1/2t 2/4/wh.dr.
	08 P.U. 3/4t 2/4/wh.dr.
1 - Tons	09 Truck, 1 Ton, All
Medium Trucks	19 Dump-Less 250 h.p.
	27 Dump-Diesel - 2/4 wh.dr.
Large Trucks	29 Truck-Tandem, All
Special Trucks	21 Truck, 5th/Stake
	22 Truck, Misc. Carrier
	23 Paint Strippers
	25 Special 4x4's
Motor Patrol	30 Motor Patrols, All
Loaders	32 Loaders, All
Misc. Off Road	31 Rollers, All
	33 Mowers, All Types
	35 Crawler Tractors
	37 Pulverizers
Special Equipment:	34 Special Equipment
	36 Miscellaneous Equipment
	39 Core Drills-Earth Augers
	41 Air Compressors
	42 Broom, All Types
	44 Support Equipment
	61 Trailers, All Types
	64 Trailer Houses

GENERAL CATEGORY	CLASS CONSOLIDATED INTO GENERAL CATEGORIES
Asphalt	62 Distributors & Boosters 63 Asphalt Equipment 65 Crusher
Snow Removal	50 One-way Plows 51 Reversible Plows 53 V-Plows 54 Snow Blowers 57 Sanders, All Types

Applies To:

Report	EMS-11	Fleet Summary
Report	EMS-12	Shop Work Load Detail
Report	EMS-12A	Shop Work Load by Area

JH:1:1rk:21E-35

CALL BACK REPAIR FREQUENCIES

(Example)

Review each class call back criteria on CICS display screen HI87.

A call back is the second repair within the number of months shown.

Class: 19 (used as an example: each class has its own criteria)

Repair Code	Description	Frequency of Repair for Call Back
Drive Train		
01	Clutch/Torque Conv.	2nd repair in 12 mo.
02	Main Transmission	2nd repair in 24 mo.
03	Aux. Trans/Trans. Case	2nd repair in 24 mo.
04	Drive Shaft/U-Joints	2nd repair in 24 mo.
05	Power Take Off	2nd repair in 12 mo.
06	Differentials/Axles	2nd repair in 12 mo.
07	Final Drive/Planetary	2nd repair in 12 mo.
Power Plant		
11	Air Intake System	2nd repair in 8 mo.
12	Fuel System	2nd repair in 12 mo.
13	Engine Repair-Minor	2nd repair in 3 mo.
14	Engine Repair-Major	2nd repair in 24 mo.
15	Cooling System	2nd repair in 1 mo.
16	Exhaust System	2nd repair in 1 mo.

Mounted Equipment

21	Hydraulic System	2nd repair in 1 mo.
22	Plow/Sander	2nd repair in 1 mo.
23	Other Mounted Equipment	2nd repair in 1 mo.

Cab and Chassis

31	Suspension System	2nd repair in 12 mo.
32	Steering System	2nd repair in 3 mo.
33	Brake System	2nd repair in 3 mo.
34	Wheel/Hub/Bearings	2nd repair in 24 mo.
35	Instruments/Gauges	2nd repair in 3 mo.
36	Body Repair	2nd repair in 1 mo.

Electrical

41	Ignition System	2nd repair in 1 mo.
42	Starting System	2nd repair in 1 mo.
43	Charging System	2nd repair in 1 mo.
44	Lighting System	2nd repair in 1 mo.

Miscellaneous

51	Air Conditioner/Heater	2nd repair in 12 mo.
52	Tires	2nd repair in 1 mo.
53	Asphalt Equipment	2nd repair in 1 mo.
55	PM Preventive Maintenance	2nd repair in 1 mo.
56	Other	2nd repair in 1 mo.

JH:1:lrk:21E-37

EMS-0550

ON-LINE REPORTS

The Equipment Management System has a data base that is accessible from all areas through the Series I computer of the areas PC's that are used for the road reporting. The information that is available is contained in Sections EMS-0551 to 0556. A brief definition and an example of the information contained on each screen formats is included with each reports definition.

The actual computer link procedures is outline in Section 0560.

EMS0551

HI 81

EQUIPMENT FILE DISPLAY

This is a two screen program that details all of the information contained in the Equipment Master File for each unit in the fleet. It contains information for the current month, year-to-date (since the fiscal year began) and historical.

Page one - details a unit's description and area assignment.

NOTE: The upper right hand side of the screen details:

- Assigned area (The area to which materials should be charged.)
- Crew number - The MMS CREW number is used for maintenance section equipment, and an area ASSIGNED number maybe used for all other assignments.
- Shop number - This is used if a unit is maintained in a shop other than the assigned area shown.
- Responsibility center - This is who is paying the assigned rate if the unit is not used.

This report also shows the miles or hours of the last Service and PM.

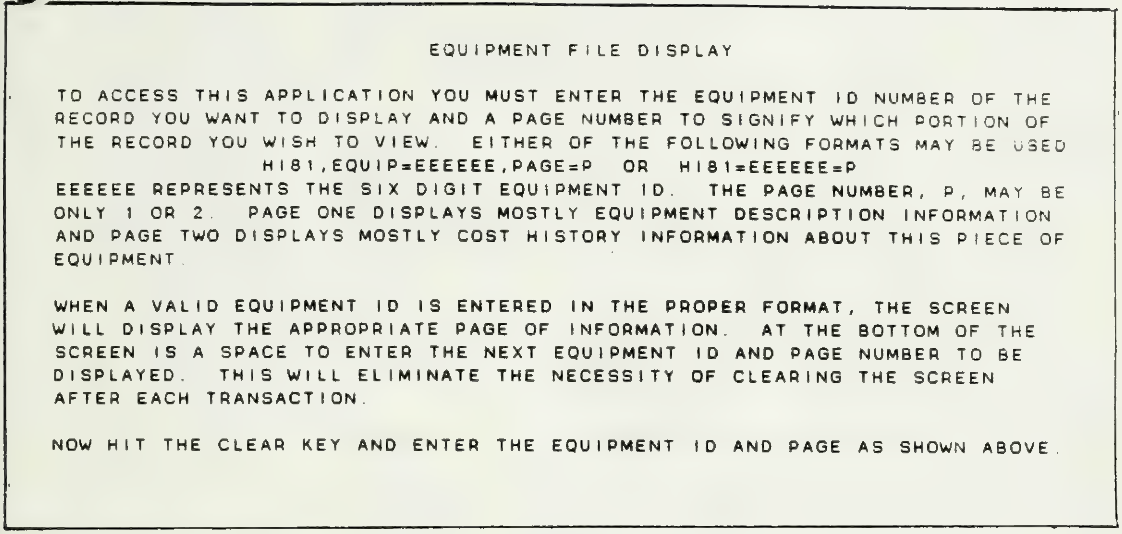
Page two - details cost and use information.

NOTE: The current month information may contain all zeros. This happens each month when the file is updated and the current month is accumulated into the year-to-date.

The instructions at the bottom of the screen details the unit being displayed and the next page to come up on the screen. To display the next page hit the enter key, or change the unit number and/or page number and hit enter.

To exit, clear the screen and enter LOGOFF.

To access another display file clear the screen and enter a different display access code.



```
                        EQUIPMENT FILE DISPLAY

TO ACCESS THIS APPLICATION YOU MUST ENTER THE EQUIPMENT ID NUMBER OF THE
RECORD YOU WANT TO DISPLAY AND A PAGE NUMBER TO SIGNIFY WHICH PORTION OF
THE RECORD YOU WISH TO VIEW.  EITHER OF THE FOLLOWING FORMATS MAY BE USED
              H181,EQUIP=EEEEEE,PAGE=P  OR  H181=EEEEEE=P
EEEEEE REPRESENTS THE SIX DIGIT EQUIPMENT ID.  THE PAGE NUMBER, P, MAY BE
ONLY 1 OR 2.  PAGE ONE DISPLAYS MOSTLY EQUIPMENT DESCRIPTION INFORMATION
AND PAGE TWO DISPLAYS MOSTLY COST HISTORY INFORMATION ABOUT THIS PIECE OF
EQUIPMENT.

WHEN A VALID EQUIPMENT ID IS ENTERED IN THE PROPER FORMAT, THE SCREEN
WILL DISPLAY THE APPROPRIATE PAGE OF INFORMATION.  AT THE BOTTOM OF THE
SCREEN IS A SPACE TO ENTER THE NEXT EQUIPMENT ID AND PAGE NUMBER TO BE
DISPLAYED.  THIS WILL ELIMINATE THE NECESSITY OF CLEARING THE SCREEN
AFTER EACH TRANSACTION.

NOW HIT THE CLEAR KEY AND ENTER THE EQUIPMENT ID AND PAGE AS SHOWN ABOVE.
```

H181=HELP SCREEN FORMAT

```
                       HIGHWAY EQUIPMENT MASTER FILE
 EQUIP. NBR.       : 190800             ASSIGN AREA      : 4240       CREW NO
 MODEL YEAR        : 86                 PURCHASE DATE    : 07/01/86    4205
 MAKE AND MODEL    : GMC 7000 DIESEL PLOW TRUCK
 MISCELLANEOUS     : PO 449573 K855181                                SHOP MN
 STATUS            : 2                  WARRANTY DATE    : 02/10/87     42
 TERMINATION CODE  :                    LIFE IN YEARS    : 09
 TERMINATION DATE  :   /  /             DEPRECIATION SCH : 09        RESP CENTER
 WORK AREA         : 4220               COLOR            : ORG       0000034220
 LAST P.M.         : 000000             GVW              : 30000
 LAST SERVICE      : 000000             FUEL TYPE        : D
 SERIAL NUMBER     : 1GDP7D1GXGV5379    IGNITION KEY     : 3X-32
 MOTOR NUMBER      : 82 08G0157966      RIM TYPE AN SIZE :
 TRANSMISSION CD.  : RT 6610            FRONT TIRE SIZE  : 1100X20
 TRANSFER CASE     :                    REAR  TIRE SIZE  : 1100X20
 NUMBER CYLINDERS  : 08                 ALTERNATOR AMPS  : 100
 ENGINE C.I.D      :                    CLUTCH           :
 DIFFERENTIAL CD.  : E22121             STEERING TYPE    : P
 DIFFERENTL RATIO  :                    BRAKE TYPE       : MA
 FRONT AXLE        :                    CARBURETOR       :
 FRONT SPRING      : 14000              WHEEL BASE       : 149
 REAR SPRING       : 23000              DUMP BOX         :

                NEXT DISPLAY: EQUIP = 190800 PAGE = 2
```

```
                       HIGHWAY EQUIPMENT MASTER FILE
                      CURRENT    YEAR TO DATE     HISTORICAL
ACCOUNT 1500            0.00                       31,381.63        EQUIP.
ACCOUNT 4170            0.00           0.00             0.00        190800
MILES OR HOURS          0.00       3,414.00        11,761.00
ASSIGN TIME             0.00         720.00         2,880.00       ODOMETER
DOWN TIME               0.00           0.00             0.00    CURRENT  ACQSTN
GALLONS FUEL            0.00         417.00         1,635.00    015272   000000
LUBE COST               0.00           0.00             0.00
LABOR COST              0.00         451.55         1,093.14      ASSIGN RATE
INSURANCE COST          0.00           0.00           155.00          192
TIRE COSTS              0.00           0.00           218.00
FUEL COSTS              0.00         253.24         1,059.70      USAGE RATE
MISC. COSTS             0.00           0.00            10.55          192
INDIRECT COST           0.00         509.81         2,194.92
NON REIMB LOSS          0.00           0.00            -9.21      RENTAL CAT
DEPRC. RESERVE          0.00       1,046.04         4,182.62          01
ACCOUNT 1502            0.00       1,046.04         4,182.62
PARTS COST              0.00          14.67            39.53    DEPRCN 07/01/75
ASSIGN EARNING          0.00       1,639.44         5,337.36           0.00
USAGE EARNING           0.00         853.50         3,338.88
USE HOURS               0.00         255.00           842.00

                NEXT DISPLAY: EQUIP = 190801 PAGE = 1
```

EMS-0552

HI 82

MOTOR POOL FILE DISPLAY

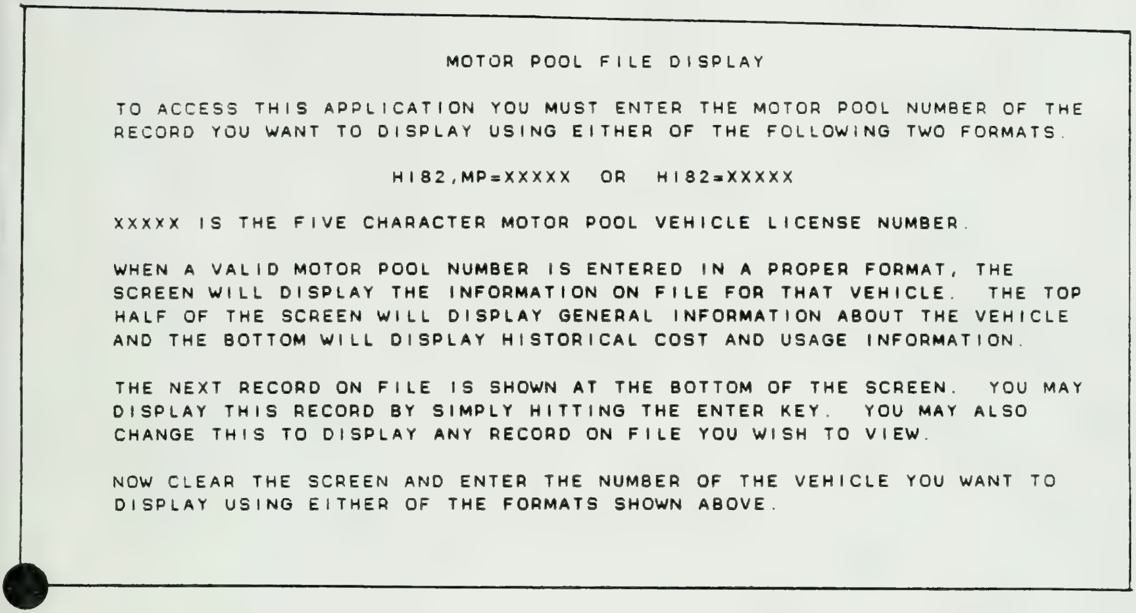
This is a one page screen that details all of the information contained on the Motor Pool Master File for each unit in the Motor Pool fleet. The top of the screen details all of the basic unit information. The bottom of the screen details all of the cost data for the current month, year-to-date and historical.

> NOTE: The current month information may contain all zeros. This happens each month when the file is updated and the current month is accumulated into the year-to-date. Also, the year-to-date information is not contained in the historical column until fiscal year end.

The instructions at the bottom of the screen details the next unit to be displayed. To display that unit hit the [enter] key, or, change the unit number and hit [enter].

To exit, clear the screen and enter LOGOFF.

To access another display file, clear the screen and enter a different display access code.



```
                    MOTOR POOL FILE DISPLAY

TO ACCESS THIS APPLICATION YOU MUST ENTER THE MOTOR POOL NUMBER OF THE
RECORD YOU WANT TO DISPLAY USING EITHER OF THE FOLLOWING TWO FORMATS.

              H182,MP=XXXXX   OR   H182=XXXXX

XXXXX IS THE FIVE CHARACTER MOTOR POOL VEHICLE LICENSE NUMBER.

WHEN A VALID MOTOR POOL NUMBER IS ENTERED IN A PROPER FORMAT, THE
SCREEN WILL DISPLAY THE INFORMATION ON FILE FOR THAT VEHICLE.  THE TOP
HALF OF THE SCREEN WILL DISPLAY GENERAL INFORMATION ABOUT THE VEHICLE
AND THE BOTTOM WILL DISPLAY HISTORICAL COST AND USAGE INFORMATION.

THE NEXT RECORD ON FILE IS SHOWN AT THE BOTTOM OF THE SCREEN.  YOU MAY
DISPLAY THIS RECORD BY SIMPLY HITTING THE ENTER KEY.  YOU MAY ALSO
CHANGE THIS TO DISPLAY ANY RECORD ON FILE YOU WISH TO VIEW.

NOW CLEAR THE SCREEN AND ENTER THE NUMBER OF THE VEHICLE YOU WANT TO
DISPLAY USING EITHER OF THE FORMATS SHOWN ABOVE.
```

H182=HELP   SCREEN FORMAT

```
                          MOTOR POOL FILE DISPLAY
VEHICLE   : 06E00    STATUS: 2          TRM DATE:
ACQ DATE  : 02/06/87                    MAKE      : CHEVY CELEBRITY
ACQ VALUE:   9,162.00     RESP. CNTR    MODEL     :
ACQ ODOM :     176        0000079597    MODEL YR: 1987
CURR ODOM:  35683                       SERIAL #: 1G1AW51R6H62077
ACCT 0522:   3,753.95     TITLE NBR.    MOTOR NO:
ACCT 0640:        0.00                  ACC 0520:   9,162.00
                     CURR MONTH              YR TO DATE            HISTORIC
MILES TRAVELED:         0.00                  4,880.00            34,158.00
GAL. FUEL USED:         0.00                    181.90             1,112.60
LUBRICATION    :        0.00                      0.00                 0.00
LABOR COST     :        0.00                      0.00               144.41
INSURANCE      :        0.00                      0.00               177.00
TIRE AND TUBE  :        0.00                      0.00                 0.00
FUEL COST      :        0.00                    153.46               918.64
PARTS AND ACC  :        0.00                      0.00               179.19
INDIRECT ADM   :        0.00                      0.00                 0.00
INDIRECT OPER  :        0.00                    168.69             1,353.10
DEPRECIATION   :        0.00                    536.31             3,753.95
EXCESS DEPRCN  :        0.00                     24.40               170.78
NONREIMB LOSS  :        0.00                      0.00                 0.00
RENT EARNINGS  :        0.00                    910.36             5,963.38
                  NEXT RECORD TO BE DISPLAYED: 06E01
```

EMS-0553

HI 84

SHOP HISTORY FILE DISPLAY

This is a thirteen screen program that details shop operations and repairs made, by repair code, over the past 12 months.

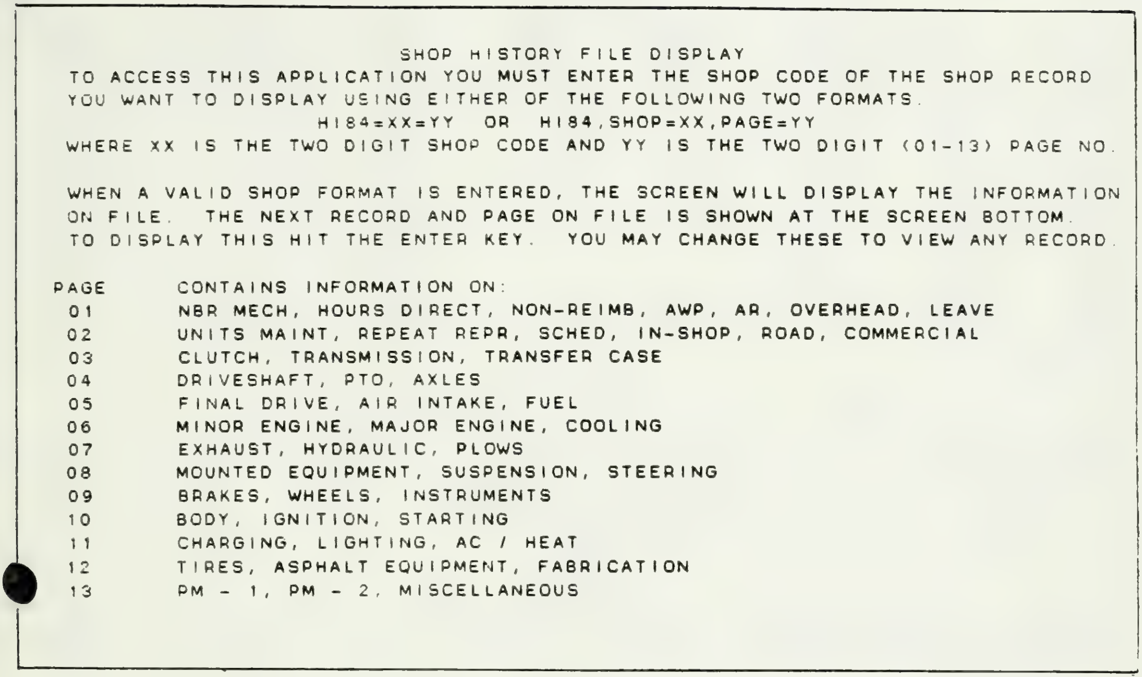
> NOTE: The number 1 month is the last months reported data, not the month of January.

- The first page details information shop employees and how their time has been spent.
- The second page deals with units maintained, and how the repairs were made: Scheduled, unscheduled, road calls, etc..
- The remaining pages show repairs made by month for each of the past 12 months by repair code (01-56).

The instructions at the bottom of the screen detail the shop being displayed and the next page that will appear.To display the next page, hit the enter key, or, change the shop number and/or page number and hit enter.

To exit clear the screen and enter LOGOFF.

To access another display file clear the screen and enter a different display access code.



```
                         SHOP HISTORY FILE DISPLAY
 TO ACCESS THIS APPLICATION YOU MUST ENTER THE SHOP CODE OF THE SHOP RECORD
 YOU WANT TO DISPLAY USING EITHER OF THE FOLLOWING TWO FORMATS.
                   HI84=XX=YY   OR   HI84,SHOP=XX,PAGE=YY
 WHERE XX IS THE TWO DIGIT SHOP CODE AND YY IS THE TWO DIGIT (01-13) PAGE NO.

 WHEN A VALID SHOP FORMAT IS ENTERED, THE SCREEN WILL DISPLAY THE INFORMATION
 ON FILE.  THE NEXT RECORD AND PAGE ON FILE IS SHOWN AT THE SCREEN BOTTOM.
 TO DISPLAY THIS HIT THE ENTER KEY.  YOU MAY CHANGE THESE TO VIEW ANY RECORD.

PAGE     CONTAINS INFORMATION ON:
 01      NBR MECH, HOURS DIRECT, NON-REIMB, AWP, AR, OVERHEAD, LEAVE
 02      UNITS MAINT, REPEAT REPR, SCHED, IN-SHOP, ROAD, COMMERCIAL
 03      CLUTCH, TRANSMISSION, TRANSFER CASE
 04      DRIVESHAFT, PTO, AXLES
 05      FINAL DRIVE, AIR INTAKE, FUEL
 06      MINOR ENGINE, MAJOR ENGINE, COOLING
 07      EXHAUST, HYDRAULIC, PLOWS
 08      MOUNTED EQUIPMENT, SUSPENSION, STEERING
 09      BRAKES, WHEELS, INSTRUMENTS
 10      BODY, IGNITION, STARTING
 11      CHARGING, LIGHTING, AC / HEAT
 12      TIRES, ASPHALT EQUIPMENT, FABRICATION
 13      PM - 1, PM - 2, MISCELLANEOUS
```

HI84=HELP SCREEN FORMAT

```
                         SHOP HISTORY FILE DISPLAY
                                 SHOP  11
                                 MISSOULA
                                 PAGE: 01

PREV      NUMBER     HOURS      HOURS     HOURS     HOURS      HOURS     HOURS
MONTH  MECHANICS    DIRECT NON-REIMB       AWP        AR   OVERHEAD     LEAVE
  1            7       652          9         0        12        232        65
  2            7       507          0         0        20        302       167
  3            7       632          0         0         1        244       144
  4            7       632          0         0         1        244       144
  5            7      1584          0         0         0        122       196
  6            7       564         27         0         0        223        62
  7            6       754          0        93         0         85        34
  8            6       686          0        57        37        184        86
  9            7       673          4        29        34        187        54
 10            7       692          0         4         0        142       139
 11            7      1202          0        70         0        120       153
 12            7       867          0         0         5         63       154

            NEXT RECORD TO BE DISPLAYED:   SHOP: 11   PAGE: 02
```

```
                         SHOP HISTORY FILE DISPLAY
                                 SHOP: 11
                                 MISSOULA
                                 PAGE: 02

PREV.        UNITS   REPEAT SCHEDULED   UNSCHED   IN-SHOP ROAD CALL   COMMRCL
MONTH   MAINTAINED  REPAIRS   REPAIRS   REPAIRS   REPAIRS   REPAIRS   REPAIRS
  1            420       16        75         6        72         9         0
  2            421        9        48         5        48         5         0
  3            413       13        84        18        76        26         0
  4            419        0        55        13        50        18         0
  5            420       19        80        14        83        11         0
  6            412        6        45         4        46         3         0
  7            412        1        48         5        50         3         0
  8            409        5        72         9        70        11         0
  9            408        5        61        14        62        13         0
 10            408        0        64        15        67        12         0
 11            408       70        80        14        83        11         0
 12            407       82        74         9        78         5         0
LIFE                             3699       898      3955       642         1

            NEXT RECORD TO BE DISPLAYED    SHOP  11   PAGE. 03
```

```
                              SHOP HISTORY FILE DISPLAY
                                      SHOP. 11
                                      MISSOULA
                                      PAGE. 03

PREV          NUMBER        HOURS        NUMBER        HOURS        NUMBER        HOURS
MONTH         CLUTCH       CLUTCH      TRANSMSN     TRANSMSN    TRNSFR CS    TRNSFR CS
  1                2            7             1            1            0            0
  2                0            0             2           14            0            0
  3                6           36             3            8            0            0
  4                5           31             1            1            1            6
  5                5           15             4           38            0            0
  6                2           35             2           52            1            4
  7                4           75             0            0            0            0
  8                4           10             3           12            1           10
  9                4           19             4           18            0            0
 10                5           46             4          116            0            0
 11                2           10             1            2            0            0
 12                8           69             6           46            6            0
LIFE             182        1,129           153        1,509           10           37

                 NEXT RECORD TO BE DISPLAYED:  SHOP: 11  PAGE: 04
```

```
                              SHOP HISTORY FILE DISPLAY
                                      SHOP: 11
                                      MISSOULA
                                      PAGE. 04

PREV.         NUMBER        HOURS        NUMBER        HOURS        NUMBER        HOURS
MONTH     DRIVESHAFT   DRIVESHAFT      P.T.O.        P.T.O        AXLES         AXLES
  1                4           20             0            0            7           54
  2                2            6             0            0            3           10
  3                2            2             1            2            5           31
  4                0            0             0            0            2            3
  5                2            4             0            0            6           19
  6                1            4             0            0            4           28
  7                0            0             0            0            1            8
  8                1            4             0            0            5           14
  9                0            0             0            0            8           14
 10                1           10             0            0            6            9
 11                0            0             0            0            1            1
 12                2            3             0            0            2            3
LIFE              57          212            13           83          194          855

                 NEXT RECORD TO BE DISPLAYED.  SHOP. 11  PAGE. 05
```

```
                         SHOP HISTORY FILE DISPLAY
                                 SHOP: 11
                                 MISSOULA
                                 PAGE: 05

PREV.       NUMBER       HOURS      NUMBER       HOURS      NUMBER      HOURS
MONTH     FINAL DR    FINAL DR  AIR INTAKE  AIR INTAKE        FUEL       FUEL
  1              0           0           0           0           5         14
  2              0           0           0           0           2          6
  3              0           0           0           0           9         47
  4              0           0           0           0           5         17
  5              0           0           0           0           6         29
  6              0           0           0           0           2         10
  7              0           0           0           0           2          8
  8              1           6           1           4           3         12
  9              0           0           0           0           6         14
 10              0           0           0           0          11         31
 11              0           0           0           0           7         12
 12              0           0           0           0           5         16
LIFE            12         191          11          20         301      1,118

               NEXT RECORD TO BE DISPLAYED:  SHOP: 11  PAGE: 06
```

```
                         SHOP HISTORY FILE DISPLAY
                                 SHOP: 11
                                 MISSOULA
                                 PAGE: 06

PREV        NUMBER       HOURS      NUMBER       HOURS      NUMBER      HOURS
MONTH    MINOR ENG   MINOR ENG   MAJOR ENG   MAJOR ENG     COOLING    COOLING
  1              6          63           1          41           8         41
  2              3           4           0           0           4         15
  3             10          53           1          22           6         20
  4              9          50           0           0           2          5
  5              8          52           2          49           3         74
  6             11          63           1          40           6         19
  7              5          16           0           0           4         11
  8             12          51           2          68           4         24
  9              9          47           0           0           7         19
 10              7          46           1         100           6         28
 11              7          22           1          26           8         39
 12             12          42           0           0          10        130
LIFE           575       2,861          49       1,332         236      1,300

               NEXT RECORD TO BE DISPLAYED.  SHOP: 11  PAGE: 07
```

```
                         SHOP HISTORY FILE DISPLAY
                                 SHOP: 11
                                 MISSOULA
                                 PAGE: 07

PREV       NUMBER      HOURS      NUMBER      HOURS     NUMBER      HOURS
MONTH     EXHAUST    EXHAUST   HYDRAULIC  HYDRAULIC      PLOWS      PLOWS
  1             1          2           6         30         11         68
  2             2          2           5         15          4         49
  3             6         18           5         21          2         25
  4             3         11          11         76          1          1
  5             6         35           6         26         12        193
  6             1          2           4         29          2         21
  7             0          0           4         20          3         67
  8             2          7          10         83         14        123
  9             3         11           9         35         17         96
 10             4          7           8         46         21        112
 11             5          9           7         52         26        175
 12             8         28           8         25         19        104
LIFE          224        641         401      1,962        631      4,913

             NEXT RECORD TO BE DISPLAYED:  SHOP: 11  PAGE: 08
```

```
                         SHOP HISTORY FILE DISPLAY
                                 SHOP: 11
                                 MISSOULA
                                 PAGE: 08

PREV.      NUMBER      HOURS      NUMBER      HOURS     NUMBER      HOURS
MONTH    MNTD EQP   MNTD EQP  SUSPENSION SUSPENSION   STEERING   STEERING
  1             5        139           1          8          5         34
  2             2         40           2          7          3         15
  3             9         70           1         15          6         28
  4            12        161           1          5          3         12
  5            11         85           3         19          4         16
  6             2         19           0          0          4         15
  7             5         72           0          0          2         10
  8             5         38           3         13          9         57
  9             2          3           2         12          3         10
 10             6         30           4         35          7         46
 11             2          5           5         14          3          7
 12             6         72           3         22          6         36
LIFE          296      2,792          91        569        282      1,297

             NEXT RECORD TO BE DISPLAYED   SHOP: 11  PAGE: 09
```

```
                      SHOP HISTORY FILE DISPLAY
                              SHOP: 11
                              MISSOULA
                              PAGE: 09

PREV        NUMBER      HOURS     NUMBER      HOURS      NUMBER      HOURS
MONTH       BRAKES     BRAKES     WHEELS     WHEELS    INSTRMNT   INSTRMNT
  1              6         51          2          3           5          7
  2              9         36          5         40           3          6
  3              9         36          2         33           5         20
  4              6         47          4         14           4         15
  5             13         42          4         41           5         13
  6              5         21          1          3           2         10
  7              6         20          0          0           3          6
  8              8         70          1          1           4          9
  9             10         36          2          8           5         12
 10             14         73          1          5           5         11
 11              9         25          2          3           4          5
 12             11         53          0          0           9         15
LIFE           535      2,058        107        549         198        584

          NEXT RECORD TO BE DISPLAYED:  SHOP: 11  PAGE: 10
```

```
                      SHOP HISTORY FILE DISPLAY
                              SHOP: 11
                              MISSOULA
                              PAGE: 10

PREV.       NUMBER      HOURS     NUMBER      HOURS      NUMBER      HOURS
MONTH         BODY       BODY   IGNITION   IGNITION    STARTING   STARTING
  1             11         33          0          0           1          5
  2              6         38          1         12           1          5
  3              3         16          1          1           3         10
  4              7         24          0          0           3          3
  5              7         16          1          2           1          1
  6              3         21          0          0           2          5
  7              5         15          1          3           1         19
  8              9         33          0          0           1          1
  9              4          6          0          0           4          9
 10              7         16          0          0           2          8
 11             10         61          1          1           5         25
 12              7         12          0          0           3         10
LIFE           343      1,314         61        220         165        497

          NEXT RECORD TO BE DISPLAYED:  SHOP: 11  PAGE  11
```

```
                          SHOP HISTORY FILE DISPLAY
                                 SHOP: 11
                                 MISSOULA
                                 PAGE 11

PREV.       NUMBER      HOURS     NUMBER      HOURS     NUMBER      HOURS
MONTH     CHARGING   CHARGING   LIGHTING   LIGHTING    AC/HEAT    AC/HEAT
  1              8         23         12         43          1          1
  2              6         17          4          4          1          3
  3              7         23          4          5          1          4
  4              5         15          6         12          1          3
  5              6         43          6         12          2          7
  6              6         10          4         13          0          0
  7              9         27         11         71          0          0
  8              5         19          8         28          1          8
  9              3         13          5         13          1          3
 10             10         27          7         14          0          0
 11             10         51         11         29          0          0
 12              7         30         11         29          2          5
LIFE           360      1,124        519      1,568         53        151

              NEXT RECORD TO BE DISPLAYED:  SHOP: 11  PAGE: 12
```

```
                          SHOP HISTORY FILE DISPLAY
                                 SHOP: 11
                                 MISSOULA
                                 PAGE: 12

PREV        NUMBER      HOURS     NUMBER      HOURS     NUMBER      HOURS
MONTH        TIRES      TIRES   ASPH EQP   ASPH EQP  FABRICATE  FABRICATE
  1              1          2          0          0          4         26
  2              1          1          0          0          4         26
  3              1          1          1          3         10         17
  4              1          1          2          3          2          4
  5              0          0          1          4          4         19
  6              0          0          0          0          4         22
  7              0          0          1          2          3         11
  8              0          0          1          1          2          3
  9              0          0          0          0          1         24
 10              0          0          0          0          1          2
 11              0          0          0          0          0          0
 12              1          2          0          0          2          4
LIFE            20         33         26        109        214      1,734

              NEXT RECORD TO BE DISPLAYED   SHOP: 11  PAGE. 13
```

```
                           SHOP HISTORY FILE DISPLAY
                                   SHOP: 11
                                   MISSOULA
                                   PAGE 13

PREV      NUMBER     HOURS      NUMBER     HOURS      NUMBER      HOURS
MONTH     P.M. - 1   P.M. - 1   P.M. - 2   P.M. - 2     MISC       MISC
  1             0          0         15        188        12         69
  2             0          0         11        128         5         31
  3             0          0          9        107        22         59
  4             0          0          5         92        12         20
  5             0          0         12        158        12         41
  6             0          0          7        114        10        272
  7             0          0          6        134        10        117
  8             0          0         20        311        16        188
  9             0          0         11        151         6         21
 10             0          0          8        151         9         44
 11             0          0         10        120         3          7
 12             0          0         21        303        21         35
LIFE            3         11        501      5,886       759      5,232

              NEXT RECORD TO BE DISPLAYED:  SHOP: 12  PAGE: 01
```

EMS-0554

HI 85

MOTOR POOL VEHICLE REPAIR HISTORY FILE DISPLAY

This is a twelve screen program that details repair information, by unit, and repair code, for the past 12 months including the total of all repairs (historical) for each unit.

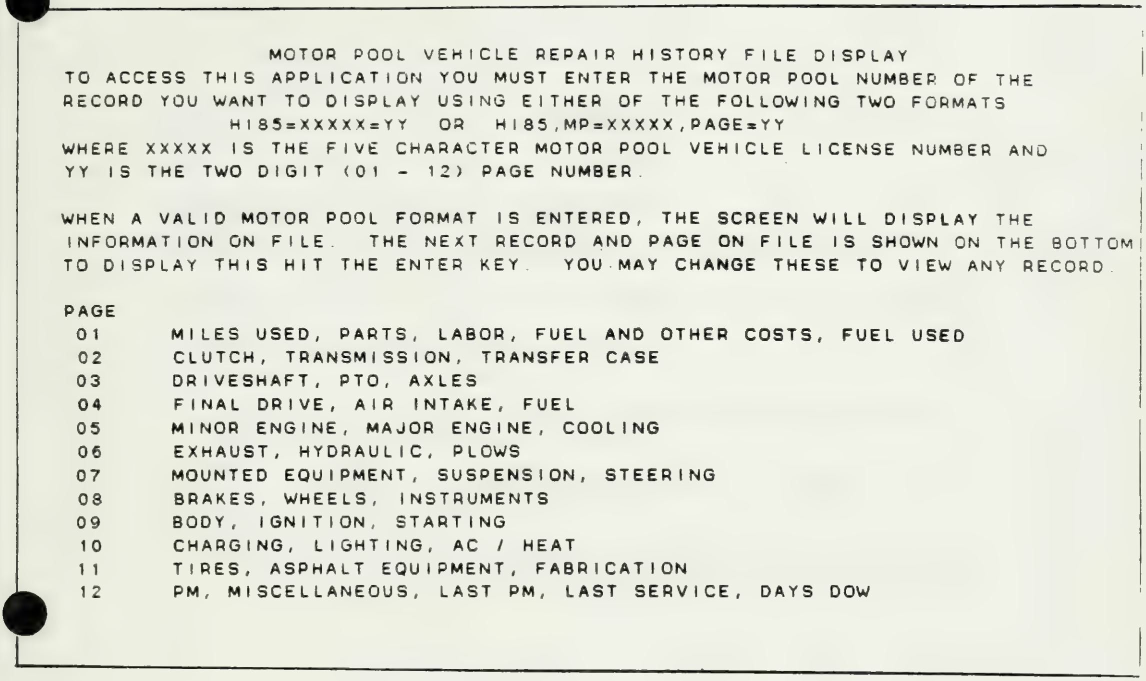
> NOTE: The number 1 month is the last months reported data, not the month of January.

- The first page deals with parts, labor, fuel, miles, etc..
- The next 11 pages are repairs, by repair code, by unit, made each month for each of the past 12 months.
- Historical data appears at the bottom of each column.
- The last 2 repair Job Order numbers will appear at the bottom of the screen. These may be used to review past repairs.

The instructions at the bottom of the screen details the current unit being displayed and the next page tat will appear on the screen. To display the next page hit the [enter] key, or, change the unit number and/or page number and hit [enter].

To exit, clear the screen and enter LOGOFF.

To access another display file clear the screen and enter a different display access code.



```
                MOTOR POOL VEHICLE REPAIR HISTORY FILE DISPLAY
TO ACCESS THIS APPLICATION YOU MUST ENTER THE MOTOR POOL NUMBER OF THE
RECORD YOU WANT TO DISPLAY USING EITHER OF THE FOLLOWING TWO FORMATS
          HI85=XXXXX=YY   OR   HI85,MP=XXXXX,PAGE=YY
WHERE XXXXX IS THE FIVE CHARACTER MOTOR POOL VEHICLE LICENSE NUMBER AND
YY IS THE TWO DIGIT (01 - 12) PAGE NUMBER.

WHEN A VALID MOTOR POOL FORMAT IS ENTERED, THE SCREEN WILL DISPLAY THE
INFORMATION ON FILE.  THE NEXT RECORD AND PAGE ON FILE IS SHOWN ON THE BOTTOM
TO DISPLAY THIS HIT THE ENTER KEY.  YOU MAY CHANGE THESE TO VIEW ANY RECORD.

PAGE
 01     MILES USED, PARTS, LABOR, FUEL AND OTHER COSTS, FUEL USED
 02     CLUTCH, TRANSMISSION, TRANSFER CASE
 03     DRIVESHAFT, PTO, AXLES
 04     FINAL DRIVE, AIR INTAKE, FUEL
 05     MINOR ENGINE, MAJOR ENGINE, COOLING
 06     EXHAUST, HYDRAULIC, PLOWS
 07     MOUNTED EQUIPMENT, SUSPENSION, STEERING
 08     BRAKES, WHEELS, INSTRUMENTS
 09     BODY, IGNITION, STARTING
 10     CHARGING, LIGHTING, AC / HEAT
 11     TIRES, ASPHALT EQUIPMENT, FABRICATION
 12     PM, MISCELLANEOUS, LAST PM, LAST SERVICE, DAYS DOW
```

HI85=HELP **SCREEN FORMAT**

SEE HI86 FOR REPORT OUTPUT FORMAT

EMS-0555

HI 86

EQUIPMENT REPAIR HISTORY FILE DISPLAY

This is a thirteen screen program that details repair information, by unit, by repair code for the past 12 months including historical total repairs.

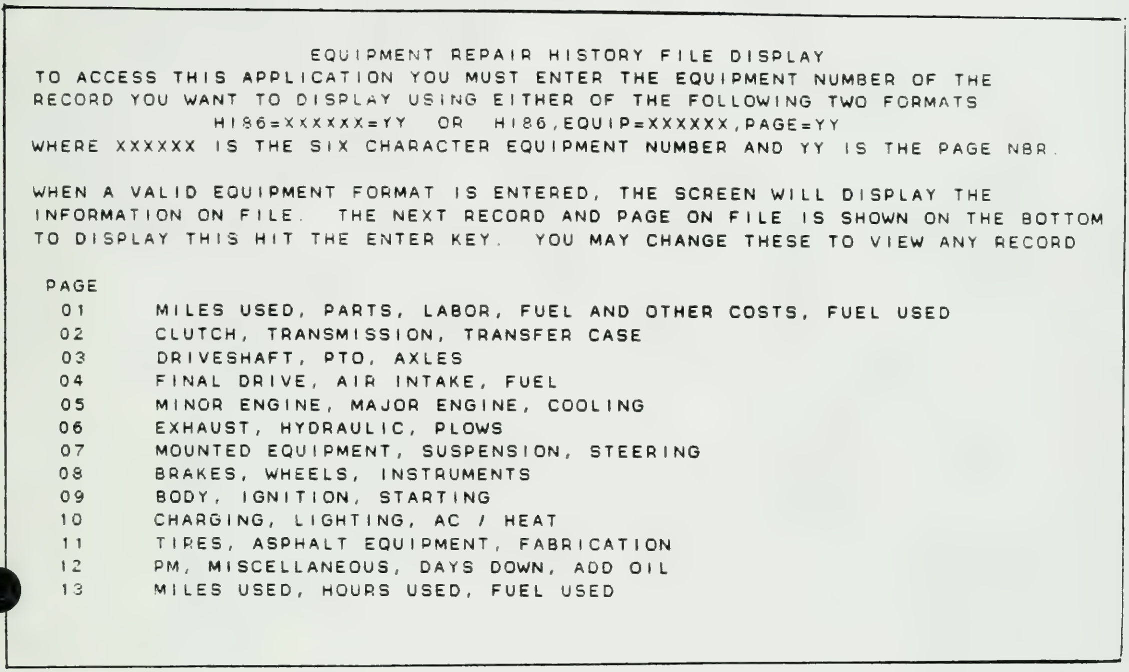
> NOTE: the number 1 month is the last months reported data, not the month of January.

- The first page deals with parts, labor, fuel, miles, etc..
- The next 11 pages are repairs, by repair code, by unit, made each month for each of the past 12 months.
- The 13th page details mileage, hourly usage, and fuel by month.
- Historical data appears at the bottom of each column.
- The last 2 repair Job Order numbers will appear at the bottom of the screen. These can be used to review past repairs.

The instructions at the bottom on the screen shows the unit being displayed and the next page that will appear on the screen. To display the next page hit the [enter] key, or, change unit number and/or page number and hit [enter].

To exit, clear the screen and enter LOGOFF.

To access another display file clear the screen and enter a different display access code.



```
                         EQUIPMENT REPAIR HISTORY FILE DISPLAY
TO ACCESS THIS APPLICATION YOU MUST ENTER THE EQUIPMENT NUMBER OF THE
RECORD YOU WANT TO DISPLAY USING EITHER OF THE FOLLOWING TWO FORMATS
              HI86=XXXXXX=YY   OR   HI86,EQUIP=XXXXXX,PAGE=YY
WHERE XXXXXX IS THE SIX CHARACTER EQUIPMENT NUMBER AND YY IS THE PAGE NBR.

WHEN A VALID EQUIPMENT FORMAT IS ENTERED, THE SCREEN WILL DISPLAY THE
INFORMATION ON FILE.  THE NEXT RECORD AND PAGE ON FILE IS SHOWN ON THE BOTTOM
TO DISPLAY THIS HIT THE ENTER KEY.  YOU MAY CHANGE THESE TO VIEW ANY RECORD

 PAGE
  01       MILES USED, PARTS, LABOR, FUEL AND OTHER COSTS, FUEL USED
  02       CLUTCH, TRANSMISSION, TRANSFER CASE
  03       DRIVESHAFT, PTO, AXLES
  04       FINAL DRIVE, AIR INTAKE, FUEL
  05       MINOR ENGINE, MAJOR ENGINE, COOLING
  06       EXHAUST, HYDRAULIC, PLOWS
  07       MOUNTED EQUIPMENT, SUSPENSION, STEERING
  08       BRAKES, WHEELS, INSTRUMENTS
  09       BODY, IGNITION, STARTING
  10       CHARGING, LIGHTING, AC / HEAT
  11       TIRES, ASPHALT EQUIPMENT, FABRICATION
  12       PM, MISCELLANEOUS, DAYS DOWN, ADD OIL
  13       MILES USED, HOURS USED, FUEL USED
```

HI86=HELP SCREEN FORMAT

```
                         EQUIPMENT REPAIR HISTORY FILE DISPLAY
                                   EQUIPMENT: 190800
                                       PAGE: 01

PREV           MILES        PARTS        LABOR         FUEL        OTHER         FUEL
MONTH           USED         COST         COST         COST        COSTS         USED
  1              517            0            0           77          419          132
  2              388            0            0           18          393           30
  3            2,185            0          162          158          420          255
  4              324           14          289                       322
  5            1,260            0            0          121          505          185
  6              548            0            0           43          394           66
  7              414            2          366           29          391           45
  8              255            6            0           32          379           49
  9            1,914            0            0          189          600          277
 10              728            0           17          105          390          151
 11              906            0          611           36          464           53
 12              103            0           18           62          353           92



                NEXT RECORD TO BE DISPLAYED:  UNIT: 190800  PAGE. 02
```

```
                         EQUIPMENT REPAIR HISTORY FILE DISPLAY
                                   EQUIPMENT: 190800
                                       PAGE: 02

PREV          NUMBER        HOURS       NUMBER        HOURS       NUMBER        HOURS
MONTH         CLUTCH       CLUTCH     TRANSMSN     TRANSMSN    TRNSFR CS    TRNSFR CS
  1              0            0            0
  2              0            0            0
  3              0            0            0
  4              0            0            0
  5              0            0            0
  6              0            0            0
  7              0            0            0
  8              0            0            1           22
  9              0            0            0
 10              0            0            0
 11              0            0            0
 12              0            0            0
LIFE                                       1           22

LAST JOB        00/00                    04/88  42304290          00/00
PREV JOB        00/00                    00/00                    00/00

                NEXT RECORD TO BE DISPLAYED:  UNIT. 190800  PAGE. 03
```

```
               EQUIPMENT REPAIR HISTORY FILE DISPLAY
                         EQUIPMENT:  190800
                            PAGE:  03

PREV.       NUMBER       HOURS       NUMBER      HOURS      NUMBER      HOURS
MONTH   DRIVESHAFT  DRIVESHAFT       P.T.O.     P.T.O.      AXLES       AXLES
  1              0           0            0
  2              0           0            0
  3              0           0            0
  4              0           0            0
  5              0           0            0
  6              0           0            0
  7              0           0            0
  8              0           0            0
  9              0           0            0
 10              0           0            0
 11              0           0            0
 12              0           0            0
LIFE

LAST JOB       00/00                   00/00                   00/00
PREV JOB       00/00                   00/00                   00/00

            NEXT RECORD TO BE DISPLAYED:  UNIT: 190800  PAGE: 04
```

```
               EQUIPMENT REPAIR HISTORY FILE DISPLAY
                         EQUIPMENT:  190800
                            PAGE:  04

PREV        NUMBER       HOURS       NUMBER      HOURS      NUMBER      HOURS
MONTH     FINAL DR    FINAL DR   AIR INTAKE AIR INTAKE       FUEL        FUEL
  1              0           0            0
  2              0           0            0
  3              0           0            0
  4              0           0            0
  5              0           0            0
  6              0           0            0
  7              0           0            0
  8              0           0            0
  9              0           0            0
 10              0           0            0
 11              0           0            0
 12              0           0            0
LIFE

LAST JOB       00/00                   00/00                   00/00
PREV JOB       00/00                   00/00                   00/00

            NEXT RECORD TO BE DISPLAYED:  UNIT: 190800  PAGE: 05
```

```
                    EQUIPMENT REPAIR HISTORY FILE DISPLAY
                              EQUIPMENT:  190300
                                  PAGE:  05

PREV.        NUMBER       HOURS       NUMBER       HOURS       NUMBER       HOURS
MONTH     MINOR ENG   MINOR ENG    MAJOR ENG   MAJOR ENG      COOLING     COOLING
  1             0           0            0
  2             0           0            0
  3             0           0            0
  4             0           0            0
  5             0           0            0
  6             0           0            0
  7             0           0            0
  8             0           0            0
  9             0           0            0
 10             0           0            0
 11             0           0            0
 12             0           0            0
LIFE

LAST JOB      00/00                  00/00                    00/00
PREV JOB      00/00                  00/00                    00/00

              NEXT RECORD TO BE DISPLAYED:   UNIT:  190800   PAGE:  06
```

```
                    EQUIPMENT REPAIR HISTORY FILE DISPLAY
                              EQUIPMENT:  190800
                                  PAGE:  06

PREV.        NUMBER       HOURS       NUMBER       HOURS       NUMBER       HOURS
MONTH       EXHAUST     EXHAUST    HYDRAULIC   HYDRAULIC        PLOWS       PLOWS
  1             0           0            0
  2             0           0            0
  3             0           0            0
  4             0           0            0
  5             0           0            0
  6             0           0            0
  7             0           0            0
  8             0           0            0
  9             0           0            0
 10             0           0            0
 11             0           0            0
 12             0           0            0
LIFE

LAST JOB      00/00                  00/00                    00/00
PREV JOB      00/00                  00/00                    00/00

              NEXT RECORD TO BE DISPLAYED:   UNIT:  190800   PAGE:  07
```

```
                          EQUIPMENT REPAIR HISTORY FILE DISPLAY
                                                  EQUIPMENT: 190800
                                                          PAGE. 07

PREV                    NUMBER               HOURS              NUMBER               HOURS              NUMBER               HOURS
MONTH                 MNTD EQP            MNTD EQP          SUSPENSION          SUSPENSION            STEERING            STEERING
    1                        0                   0                   0
    2                        0                   0                   0
    3                        0                   0                   0
    4                        0                   0                   0
    5                        0                   0                   0
    6                        0                   0                   0
    7                        0                   0                   0
    8                        0                   0                   0
    9                        0                   0                   0
   10                        0                   0                   0
   11                        0                   0                   0
   12                        0                   0                   0
LIFE                                                                                                         1                   1

LAST JOB                     00/00                                   00/00                                   03/87         42294970
PREV JOB                     00/00                                   00/00                                   00/00

                     NEXT RECORD TO BE DISPLAYED:  UNIT:  190800   PAGE:  08
```

```
                          EQUIPMENT REPAIR HISTORY FILE DISPLAY
                                                  EQUIPMENT: 190800
                                                          PAGE: 08

PREV.                   NUMBER               HOURS              NUMBER               HOURS              NUMBER               HOURS
MONTH                   BRAKES              BRAKES              WHEELS              WHEELS            INSTRMNT            INSTRMNT
    1                        0                   0                   0
    2                        0                   0                   0
    3                        0                   0                   0
    4                        0                   0                   0
    5                        0                   0                   0
    6                        0                   0                   0
    7                        0                   0                   0
    8                        0                   0                   0
    9                        0                   0                   0
   10                        0                   0                   0
   11                        0                   0                   0
   12                        0                   0                   0
LIFE

LAST JOB                     00/00                                   00/00                                   00/00
PREV JOB                     00/00                                   00/00                                   00/00

                     NEXT RECORD TO BE DISPLAYED:  UNIT:  190800   PAGE:  09
```

```
                    EQUIPMENT REPAIR HISTORY FILE DISPLAY
                              EQUIPMENT  190800
                                  PAGE:  09

PREV         NUMBER       HOURS       NUMBER       HOURS       NUMBER       HOURS
MONTH          BODY        BODY     IGNITION     IGNITION     STARTING    STARTING
  1               0           0            0
  2               0           0            0
  3               0           0            0
  4               0           0            0
  5               0           0            0
  6               0           0            0
  7               0           0            0
  8               0           0            0
  9               0           0            0
 10               0           0            0
 11               1          50            0
 12               0           0            0
LIFE              1          50

LAST JOB      12/87   42303350         00/00                     00/00
PREV JOB      00/00                    00/00                     00/00

                NEXT RECORD TO BE DISPLAYED:   UNIT:  190800   PAGE:  10
```

```
                    EQUIPMENT REPAIR HISTORY FILE DISPLAY
                              EQUIPMENT:  190800
                                  PAGE:  10

PREV         NUMBER       HOURS       NUMBER       HOURS       NUMBER       HOURS
MONTH      CHARGING    CHARGING     LIGHTING     LIGHTING      AC/HEAT     AC/HEAT
  1               0           0            0
  2               0           0            0
  3               0           0            0
  4               0           0            0
  5               0           0            0
  6               0           0            0
  7               0           0            0
  8               0           0            0
  9               0           0            0
 10               0           0            0
 11               0           0            0
 12               0           0            0
LIFE

LAST JOB      00/00                    00/00                     00/00
PREV JOB      00/00                    00/00                     00/00

                NEXT RECORD TO BE DISPLAYED:   UNIT   190800   PAGE   11
```

```
                 EQUIPMENT REPAIR HISTORY FILE DISPLAY
                          EQUIPMENT: 190800
                              PAGE: 11

PREV        NUMBER      HOURS       NUMBER      HOURS       NUMBER      HOURS
MONTH       TIRES       TIRES      ASPH EQP    ASPH EQP   FABRICATE   FABRICATE
  1             0           0           0
  2             0           0           0
  3             0           0           0
  4             0           0           0
  5             0           0           0
  6             0           0           0
  7             0           0           0
  8             0           0           0
  9             0           0           0
 10             0           0           0
 11             0           0           0
 12             0           0           0
LIFE

LAST JOB       00/00                  00/00                   00/00
PREV JOB       00/00                  00/00                   00/00

          NEXT RECORD TO BE DISPLAYED:  UNIT: 190800   PAGE: 12
```

```
                 EQUIPMENT REPAIR HISTORY FILE DISPLAY
                          EQUIPMENT: 190800
                              PAGE: 12

PREV.       NUMBER      HOURS       NUMBER      HOURS        DAYS         ADD
MONTH        P.M.        P.M.        MISC        MISC        DOWN         OIL
  1             0           0           0
  2             0           0           0
  3             0           0           0
  4             0           0           0
  5             0           0           0
 .6             0           0           0
  7             0           0           0
  8             0           0           0                       5
  9             0           0           0
 10             0           0           0                                   5
 11             0           0           0                      13
 12             0           0           0
LIFE                                                           18           7

LAST JOB       00/00                  00/00
PREV JOB       00/00                  00/00

          NEXT RECORD TO BE DISPLAYED:  UNIT: 190800   PAGE: 13
```

```
                    EQUIPMENT REPAIR HISTORY FILE DISPLAY
                                 EQUIPMENT  190800
                                     PAGE:  13

PREV.           MILES         HOURS          FUEL
MONTH            USED          USED          USED
  1               517            48           132
  2               388            29            30
  3             2,185           161           255
  4               324            17             0
  5             1,260           105           185
  6               548            27            66
  7               414            39            45
  8               255            63            49
  9             1,914           112           277
 10               728            50           151
 11               906            88            53
 12               103             6            92



              NEXT RECORD TO BE DISPLAYED:  UNIT: 190801  PAGE: 01
```

EMS-0556

HI 87

MOTOR POOL, AND EQUIPMENT BUREAU CLASS AND SUBCLASS STANDARD DISPLAY

This is a one page display that is used to review the standards used in the various system reports. This display can be used to access the Motor Pool fleet classes, Equipment Bureau fleet classes and Equipment Bureau subclasses depending on the menu options requested. The display has 3 major portions:

1) The top details the class of unit being reviewed, service intervals, and estimated hours to complete a PM Level II.

2) The center section details the upper and lower parameters used to determine substandard miles, availability, usage, costs and down time.

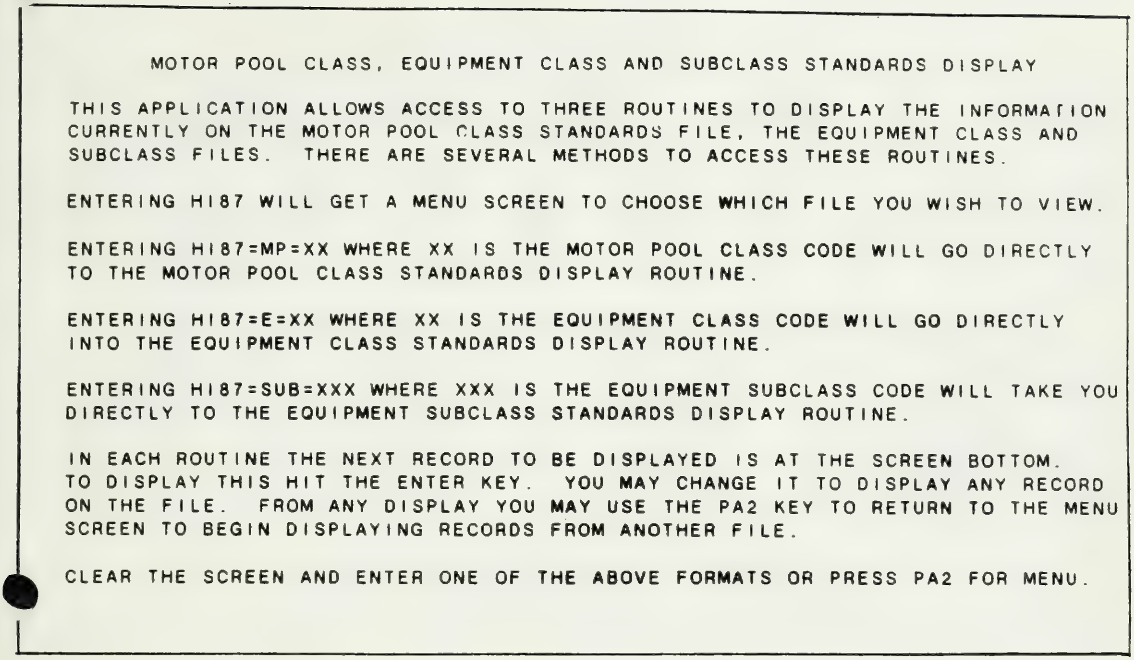
3) The bottom section details the time elements used in determining repair call-backs.

NOTE: For a repair to be a call-back, it has to be the second repair within the time elements noted. Time is shown in months. i.e. 01 CLUTCH 12.0 (the second repair within 12 months will produce a call-back on the EMS-05 Call-back Report).

The instructions at the bottom of the screen detail the next class that will appear on the screen. To display the next page hit the [enter] key, or, change the page number and hit [enter] key.

To exit, clear the screen and enter LOGOFF.

To access another display file, clear the screen and enter a different display access code.



```
        MOTOR POOL CLASS, EQUIPMENT CLASS AND SUBCLASS STANDARDS DISPLAY

   THIS APPLICATION ALLOWS ACCESS TO THREE ROUTINES TO DISPLAY THE INFORMATION
   CURRENTLY ON THE MOTOR POOL CLASS STANDARDS FILE, THE EQUIPMENT CLASS AND
   SUBCLASS FILES.  THERE ARE SEVERAL METHODS TO ACCESS THESE ROUTINES.

   ENTERING HI87 WILL GET A MENU SCREEN TO CHOOSE WHICH FILE YOU WISH TO VIEW.

   ENTERING HI87=MP=XX WHERE XX IS THE MOTOR POOL CLASS CODE WILL GO DIRECTLY
   TO THE MOTOR POOL CLASS STANDARDS DISPLAY ROUTINE.

   ENTERING HI87=E=XX WHERE XX IS THE EQUIPMENT CLASS CODE WILL GO DIRECTLY
   INTO THE EQUIPMENT CLASS STANDARDS DISPLAY ROUTINE.

   ENTERING HI87=SUB=XXX WHERE XXX IS THE EQUIPMENT SUBCLASS CODE WILL TAKE YOU
   DIRECTLY TO THE EQUIPMENT SUBCLASS STANDARDS DISPLAY ROUTINE.

   IN EACH ROUTINE THE NEXT RECORD TO BE DISPLAYED IS AT THE SCREEN BOTTOM.
   TO DISPLAY THIS HIT THE ENTER KEY.  YOU MAY CHANGE IT TO DISPLAY ANY RECORD
   ON THE FILE.  FROM ANY DISPLAY YOU MAY USE THE PA2 KEY TO RETURN TO THE MENU
   SCREEN TO BEGIN DISPLAYING RECORDS FROM ANOTHER FILE.

   CLEAR THE SCREEN AND ENTER ONE OF THE ABOVE FORMATS OR PRESS PA2 FOR MENU.
```

HI87=HELP   SCREEN FORMAT

```
                        EQUIPMENT CLASS STANDARDS DISPLAY

CLASS      CLASS          CATEGORY   CATEGORY          SERVICE      PM       PM HOURS
CODE   DESCRIPTION          CODE     DESCRIPTION       INTERVAL   INTERVAL   REQUIRED
 19    19 DUMP TRUCK         F       MEDIUM TRUCKS       3,000     20,000       28.0

LOWER   UPPER   LOWER   UPPER   LOWER   UPPER   LOWER   UPPER   LOWER   UPPER
LIMIT   LIMIT   LIMIT   LIMIT   LIMIT   LIMIT   LIMIT   LIMIT   LIMIT   LIMIT
MILE/   MILE/   AVAIL   AVAIL   USAGE   USAGE   COSTS   COSTS   DOWN    DOWN
HR %    HR %      %       %       %       %       %       %     TM %    TM %
 50      300      80     150      50     300      25     200      0      200

        REPAIR CODES, DESCRIPTIONS AND ALLOWABLE MONTHS BETWEEN REPAIRS
01 CLUTCH     12.0   12 FUEL SYS   12.0   31 SUSPENSN  12.0   43 CHARGING    1.0
02 TRANSMSN   24.0   13 MINOR ENG   3.0   32 STEERING   3.0   44 LIGHTING    1.0
03 TRNSFR CS  24.0   14 MAJOR ENG  24.0   33 BRAKES     3.0   51 AC/HEAT    12.0
04 DRVSHFT    24.0   15 COOLING     1.0   34 WHEELS    24.0   52 TIRES       1.0
05 P.T.O.     12.0   16 EXHAUST     1.0   35 INSTRMNT   3.0   53 ASPH EQP    1.0
06 AXLES      12.0   21 HYDRAULIC   1.0   36 BODY       1.0   54 FABRICATE   1.0
07 FINAL DR   12.0   22 PLOWS       1.0   41 IGNITION   1.0   55 PM          1.0
11 AIR INTAK   8.0   23 MNTD EQP    1.0   42 STARTING   1.0   56 OTHER       1.0

                     NEXT EQUIPMENT CLASS TO BE DISPLAYED  21
                  USE THE PA2 KEY TO RETURN TO THE MENU SCREEN
```

EMS-0560

CICS ON LINE REPORT ACCESS

Access to on line reports (HI Reports) can be obtained through either the Series I terminals or through PC's that are used for the road report.

On Line Access:

CICS is the main frame computer access controller at the Department of Administration in Helena.

To access the main frame computer, select your menu option for:

Crosstalk or Road report depending on how the menu is set-up. Continue this process until a connection has been established to the main frame computer.

Follow Application Access Procedure EMS-0561 to logon to CICS.

CICS PC ACCESS PROCEDURE

PC Application __________ Series I Application __________

Modem Ready: ______________________________

Menu Option: ______________________________

____

Step Instructions:

1) ______________________________

____

2) ______________________________

____

3) ______________________________

____

4) ______________________________

____

5) ____

____

Logon Name: ____________________

Password: ____________________

Account: ____________________

ENTER

Successful logon will be noted at the bottom of the screen:

Operations Notes: (after the logon is completed)

Clear the screen: Hold CNTRL key down and hit the C key.
(Cross talk-method/F-2 key on the Series I.)

The screen should clear except for the cursor in the upper left hand corner.

Report Format: (enter key)	Use any appropriate format (see help screen for formats EMS-0550 through 0556). If an error message is returned, clear the screen and enter HIXX=Help. A detailed explanation of the proper report access and application screen will appear (XX is the report requested). Clear the screen after you have read the help screen and re-enter the appropriate report format. Hit enter and the report screen should appear.
Next Record to be Displayed: (Bottom of most reports)	
Unit:	If data from another unit is required, change the unit number to the unit number desired, then enter. If the unit number shown is the next record required hit enter.
Page:	When the page number shown is the next record you want to view, just hit the enter key. If you want to go to another page within the report, move the cursor to the page number and change the page number and hit enter.

To Change Reports: Clear the screen. At this time you can enter a new HIXX report format or

To Exit: Hold CNTRL key down and hit the C key. This will clear the screen. At this time you can enter Logoff and hit enter. This will exit you from CICS and the main frame computer.

Phone Connection: When you have logged off, the screen will come back with = =

Hold the ESC key and enter QU. This should break the communications connection and return the PC to the main menu.

If you have any question on the logon or off process, talk to the operator that does the road report or the District Centralized Services Supervisor. For information on the reports or the report formats, contact the Equipment Bureau.

JH:1:lrk:21E-42

EMS-0600

INTRODUCTION

The Department of Highways developed an Equipment Management System to better manage its fleet. The system is designed to help supervisors monitor performance and cost without a lot of paperwork. It will also assist managers in making decisions regarding preventive maintenance, utilization and replacement.

In order for the system to work, fleet information must be collected and summarized. Much of this information has to come from the field -- what units are being repaired, what types of repairs are being made and the frequency of repair.

This manual has been developed to outline the procedures and methods for obtaining the desired information. It will help you in filling out the Shop Job Order and using the Repair Codes. It also contains a brief description of how the information you provide will be used to help manage the fleet.

EMS-0610

EQUIPMENT REPAIR CODES

Repair codes are used to describe the kinds of repair and maintenance work performed on vehicles and equipment.

Equipment repair codes (32 in all) are listed on the next four pages. In using these repair codes, you need to remember three main points:

1. Review the codes and definitions. Become familiar with the basic structure, as well as the definitions.

2. Make sure you record the correct code number on the Shop Job Order. If there are *any* questions about the correct number, check with your supervisor!

3. The repair codes are general in nature. The definitions contained herein, plus your experience, should minimize incorrect coding. If specific problems continually reoccur, advise the Equipment Bureau, your suggestions for refinements are important!

Accurate reporting will help you and other equipment managers make sound decisions in the day to day operation of the fleet. The repair codes are essential to the overall process.

EQUIPMENT REPAIR CODE DESCRIPTIONS

CODE	DESCRIPTION
DRIVETRAIN	
01	CLUTCH/TORQUE CONV.: Adjustments or repairs to the clutch or torque converter, including clutch plates, throw-out bearings and all linkages and controls. Includes pressure checks.
02	MAIN TRANSMISSION: Adjustment, repair, overhaul or replacement of the main transmission, its linkages and controls.
03	AUXILIARY TRANS./TRANSFER CASE: Adjustment, repair, overhaul or replacement of the auxiliary transmission and/or transfer case, including any linkages and controls.
04	DRIVE SHAFT/U JOINTS: Repair or replacement of the drive shaft(s) or the universal joints, including carrier bearings.
05	POWER TAKEOFF: Repair or replacement of the power takeoff unit and its linkages, controls shafts and attaching devices.
06	DIFFERENTIAL/AXLES: Repair or replacement of the front or rear axle, differential unit, or any linkage and controls.

07 FINAL DRIVE/PLANETARY: Repairs to final drive components where there is a gear or chain reduction beyond the differential but that are part of the main drive.

POWER PLANT

11 AIR INTAKE SYSTEM: Repairs to the air intake system including ducting, precleaner, air cleaner, and turbo charger.

12 FUEL SYSTEM: Repairs to the fuel system including gas cap, inlet tube, fuel tank, fuel line, filter, fuel pump, carburetor and/or fuel injectors.

13 ENGINE REPAIR-MINOR: Any minor repair to the engine that does not require removing the head and/or pan. Includes engine tune-up, timing adjustment, intake manifold repair, emission control component replacement, or the repair/replacement of any external engine components.

14 ENGINE REPAIR-MAJOR: Major engine repair or overhaul that requires removing the head and/or oil pan. Includes repair or replacement of the head, block, oil pan, flywheel, camshaft and all internal parts. Includes replacement of the entire engine or block with a new or rebuilt engine or short block.

15 COOLING SYSTEM: Repairs to the cooling system including the radiator, water pump, thermostat, fan, fan belts and hoses.

16 EXHAUST SYSTEM: Repairs to the exhaust system including exhaust manifold, header pipe, muffler, catalytic converter, tail pipe and attaching brackets.

MOUNTED EQUIPMENT

21 HYDRAULIC SYSTEM: Repairs to the hydraulic system including the hydraulic reservoir, pump, motors, control valves, rams, meters, hoses, and fittings. Also use this code for spray guns on painting equipment.

22 PLOWS/SANDERS: Structural repairs to plows and sanders, including supports, frames, blades, and mold boards.

23 OTHER MOUNTED EQUIP.: Repairs to all other mounted equipment not covered by other repair codes, including structural repairs or replacement of beds, hoppers, buckets, hoisting devices, trucks, mower attachments and winches. Includes repairs of linkages, controls, blades and wearing surfaces.

CAB & CHASSIS

31 SUSPENSION SYSTEM: Repairs to the suspension system including springs, shock absorbers, A frames, ball joints and frame rails.

32 STEERING SYSTEM: Repairs to the steering system including steering wheel and column, steering sector tie rods, stabilizer arm, power steering pump and assist rams and front end alignment.

33 BRAKE SYSTEM: Adjustment or repairs to the brake system including the brake pedal, master cylinder, power assist unit, brake lines, slave cylinders and brake shoes on hydraulic brakes and the air compressor, air lines, air tanks and control lines on air brakes. Includes adjustment or repair to the parking brake system.

34 WHEELS/HUBS/BEARINGS: Repair or replacement of wheels, hubs, wheel studs or wheel bearings.

35 INSTRUMENTS/GAUGES: Repair or replacement of gauges including speedometer, odometer, hour meter, oil pressure, temperature, etc.

36 BODY REPAIR: Repair, replacement or painting of any item of the cab or body that would not be reported under another code. Use this code for repairs/replacements of seats, headliner, dashboard, door panels, windshield, windows, mirrors, windshield wipers, doors, handles, bumpers, fenders, grill and hood.

ELECTRICAL

41 IGNITION SYSTEM: Repairs to any part of the ignition system including points, plugs, condenser, distributor, vacuum advance mechanism, coil, electronic modules, wiring and ignition switch.

42 STARTING SYSTEM: Repairs to the starting system including the battery, starter motor, ring gear on flywheel, solenoid and wiring.

43 CHARGING SYSTEMS: Repairs to the charging system including the alternator or generator, voltage regulator and wiring.

44 LIGHTING SYSTEM: Repairs to any part of the lighting system including head lights, tail lights, clearance lights, interior lights, turn signals, warning lights, and arrow boards. Also included is any other electrical component not covered under any other code.

MISCELLANEOUS

51 AIR CONDITIONER/HEATER: Repairs to the air conditioning and heating system including compressor, condenser, evaporator, hoses, vents, linkages and controls.

52 TIRES: Repair, replacement and balancing of tubes and tires only if done by a mechanic.

53 ASPHALT EQUIPMENT: Repair or replacement of components on asphalt plants, tar pots, heaters, sealers, recyclers, pavers and distributors including spray bars.

54 MANUF/FABRICATE: All work to weld, manufacture or fabricate components, frames, beds, boxes, hitches, etc.

55 PM: All PM Level II's performed in the shop by shop personnel. Include service combination A/B time on job order if they are receiving mechanics differential or assisting in a Level II PM. Check PM Program for service intervals and specific work to be done.

56 OTHER: All other repairs not covered by a specific repair code, including diagnostic time and time for warranty work performed by outside vendors so that down time can be tracked. Charge 1 hour of repair to code 56 and note warranty repairs on job order.

EMS-0620

SHOP JOB ORDER

The Shop Job Order is a basic document for operation of the EMS system. It is used to record information about what work is done to equipment. It is also used for data input. The Job Order also standardizes equipment records. But the benefits of a standard job order depend on your effort to keep accurate records.

USING THE SHOP JOB ORDER

The Shop Job Order is an important document in the Equipment Management System. It documents, by unit, specific data such as what repairs were done, who did the work and the number of hours required. This document is used to determine repair hours, by type of repair, and downtime.

The Shop Job Order is a three-part form. The first (white) copy is used for data entry and should be given to the Stocker w/Terminal after the work order is complete. The second (yellow) copy should be sent to the Equipment Bureau. The third (hard) copy should be retained by the shop.

Both the front and back of the form may be used. The front side summarizes all the work done and is used for data entry. The back of the hard copy is used as a worksheet to help keep track of what work was done, when it was done and if any parts were used. The information on the back side of the form does not go into the system, but since the hard copy is a permanent file copy, information written on the back will be retained for reference.

Examples of a completed Shop Job Order are shown on the following pages.

A Job Order should be used whenever a job takes more than 30 minutes to complete or involves more than $40 for part's.

SHOP PROCEDURES

TABLE OF CONTENTS

Reference No.

INTRODUCTION 0600

EQUIPMENT REPAIR CODES 0610

THE SHOP JOB ORDER 0620

JOB ORDER SUMMARY. 0630

JOB ORDER DATA INPUT INSTRUCTIONS. 0640

EMS 2

State of Montana Department of Highways

SHOP JOB ORDER

UNIT NO. H ☐☐ - ☐☐☐☐

JOB ORDER ☐☐ 05930 ☐

MI. / HRS. ☐☐☐☐☐☐ .0

DAYS DOWN ☐☐☐

PM LEVEL ☐

Make: ____________ Model: ____________

Year: ________ Location: ____________

Date Initiated: ___ / ___ / ___

Authorization

Date Completed ___ / ___ / ___ ___ - ___

4260 ☐ AWP ☐☐☐☐ AR ☐☐☐☐

WORK CODE Scheduled ☐ Unscheduled ☐

LOCATION CODE Shop ☐ Commercial ☐ Road Call ☐

Comments: ____________

Repair Code	Work to be Performed	Repairs Made	Mech. Inits.	Hours

DISTRIBUTION White - Data Entry Yellow - Equipment Bureau, Hard Copy - Shop File

SHOP JOB ORDER – WORK SHEET

UNIT NO. H☐☐-☐☐☐☐ JOB ORDER ☐☐________☐

DATE	MECH. INIT.	REPAIR CODE	HOURS	COMMENTS

QTY.	PARTS	COST	QTY.	PARTS	COST

REPAIR CODES

DRIVE TRAIN

01 Clutch/Torque Conv.
02 Main Transmission
03 Aux. Trans./Trans. Case
04 Drive Shaft/U-joints
05 Power Take Off
06 Differentials/Axles
07 Final Drive/Planetary

POWER PLANT

11 Air Intake System
12 Fuel System
13 Engine Repair – Minor
14 Engine Repair – Major
15 Cooling System
16 Exhaust System

MOUNTED EQUIPMENT

21 Hydraulic System
22 Plows/Sanders
23 Other Mounted Equip.

CAB & CHASSIS

31 Suspension System
32 Steering System
33 Brake System
34 Wheel/Hub/Bearings
35 Instruments/Gauges
36 Body Repair

ELECTRICAL

41 Ignition System
42 Starting System
43 Charging System
44 Lighting System

MISCELLANEOUS

51 Air Conditioner/Heater
52 Tires
53 Asphalt Equipment
54 Manuf./Fabricate
55 PM
56 Other

Using the Job Order is not complicated, but you need to know how to perform the basic entries. The following instructions are designed to assist:

1 Enter general information about the unit being repaired such as make, model and year and where the unit is assigned. Also note the date the work was started (day, month and year) and the date the work was completed. This entry will help calculate down-time. The Shop Job Order should be initiated when the shop supervisor determines or is notified that the unit is inoperable.

2 Enter the unit number.

3 Enter the two-digit area code in the boxes to the left of the preprinted order number. Also enter the shop type code to the right of the preprinted order number. The codes are:

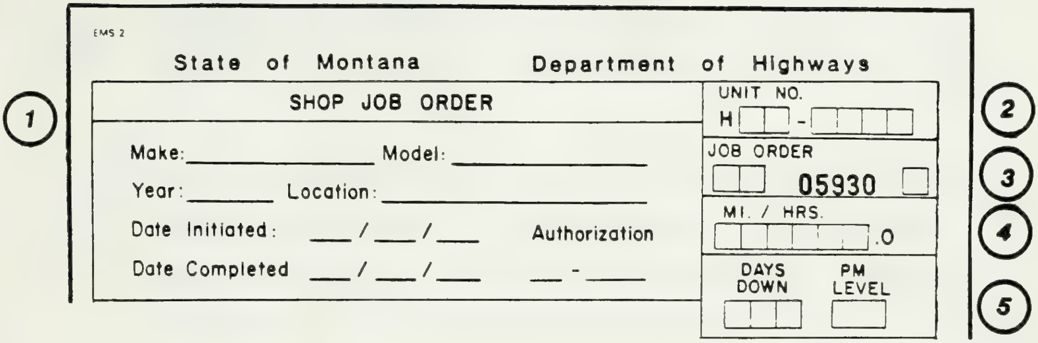
Area Codes

11	-	Missoula	41	-	Glendive
12	-	Kalispell	42	-	Wolf Point
21	-	Butte	51	-	Billings
22	-	Bozeman	52	-	Miles City
31	-	Great Falls	53	-	Lewistown
32	-	Havre	93	-	Headquarters Shop

Shop Type Codes

0	-	(or blank) designates all area shops
1	-	designates the first satellite shop
2	-	designates the second satellite shop, etc. ....

4 Record the current odometer or hour meter reading to the nearest whole number. Do not record tenths of a mile or hour. If the unit does not have a meter enter "N/A." For hourly equipment use EMS system hours rather than hour meter hours. Hour meter hours and EMS system hours are not the same.


EMS 2

State of Montana Department of Highways

SHOP JOB ORDER

Make: ____ Model: ____

Year: ____ Location: ____

Date Initiated: __/__/__ Authorization

Date Completed __/__/__ __-____

UNIT NO.

H ☐☐ - ☐☐☐☐

JOB ORDER

☐☐ 05930 ☐

MI. / HRS.

☐☐☐☐☐☐ .0

DAYS DOWN ☐☐☐ PM LEVEL ☐

5 Enter the number of days down and, if appropriate, the PM service level performed. Calculate downtime days in whole days using the number of days between the "date initiated" and the "date completed." Do not record downtime if the unit is repaired in less than 4 hours. The rules for calculating downtime are as follows:

A - A unit is not down if it is able to be driven into the shop. Downtime begins when the unit is scheduled into the shop.

B - If a unit is inoperable and a mechanic has to be sent to the site, the unit is down as of the date the Shop Superintendent is notified.

C - PM level II's shall be included as downtime. Any additional repairs made while a PM is being performed shall be coded to the appropriate repair code and is also recorded as downtime.

D - Downtime will only be recorded for full days. If a repair takes more than 4 hours, downtime is recorded for a full day.

⑥	4260 ☐	AWP ☐☐☐☐ AR ☐☐☐☐
⑦	WORK CODE	Scheduled ☐ Unscheduled ☐
	LOCATION CODE	Shop ☐ Commercial ☐ Road Call ☐

6 Check the appropriate box if the work is charged to account 4260 or to a separate AWP/AR number. If there is more than one AWP/AR number for a job, make out two Job Orders. All 4260 Labor is to be charged out at $24.00 per hour plus parts and/or materials.

7 Check the box that best describes how the work was planned using the following guidelines:

Scheduled

Did the Shop Superintendent had sufficient advance notice of needed repairs to schedule unit into the Shop? To be a scheduled repair, the Shop Superintendent must have a minimum of 8 hours advance notice of required repair. Some type of weekly log should be maintained to reflect the work that needs to be done.

Unscheduled

Was the unit brought into the shop or necessitated a road call and was not scheduled 8 hours in advance of the work.

Also, check one of the three boxes that designate where the work was done:

In Shop

Work done within the area shop or satellite facility.

Commercial

Work done in a private or commercial facility. Code 1 hour of time to Repair Code 56 and enter appropriate days down.

Road Call

Repairs done by shop personnel away from the area or satellite shop.

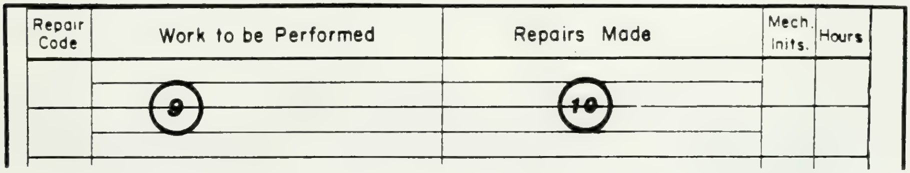
8 Comments. This space is provided for remarks or comments that will help accomplish the work. The comments may come from an operator or supervisor when the Job Order is initiated (including the date when the shop was made aware of the problem), or they may come from a mechanic or Shop Superintendent to facilitate work that can be scheduled at a later date. ⑧

Comments: ______________________________

9 Record repair instructions and appropriate repair codes in this location. The Shop Superintendent should note basic repair instructions and enter appropriate repair codes.

10 The mechanic should use this area to record the actual work performed. Use brief phrases such as "repaired starter, adjusted belt tension, inspected wiring, installed new alternator or fabricated plow hitch." Also, the mechanic should record any additional repairs or

maintenance he performed. The Shop Superintendent should enter the appropriate repair code for any additional work. Mechanics should place their initials next to the description of required work as each item is completed.



Repair Code	Work to be Performed	Repairs Made	Mech. Inits.	Hours

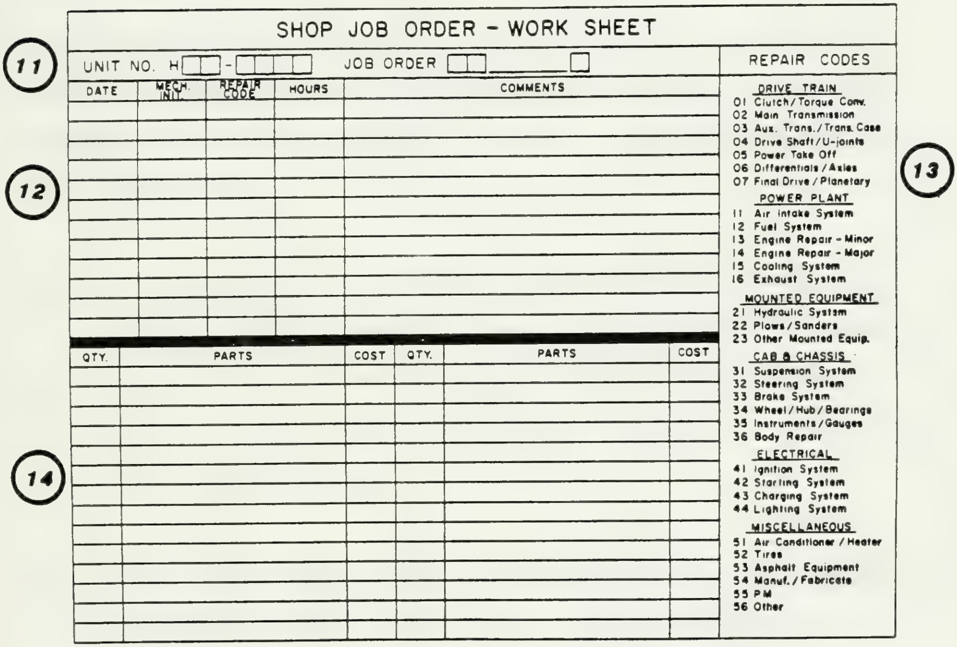
The back side of the Shop Job Order may be used to accumulate work done over a period of time by several mechanics. It may also be used to list parts used or additional repair code details. It should be filled out as follows:

11 Fill in the unit number and Job Order number.

12 Use this area to keep track of the time being spent on the repair. For each day worked, note the date, hours worked, repair code, and mechanics initials. The comments section may be used by the mechanic for additional information about the work being done. Accumulated time, by repair code should be transferred to the front of the job order on completion of the work.

13 Use these repair codes when filling out either side of the job order. Use good judgment when deciding which code to use. If you have a question, review the repair code descriptions in Section 610 of this manual.

14 Enter the quantity, description and cost of parts in this location. This is shop information only. Parts and costs are not entered into the system from this document.



SHOP JOB ORDER – WORK SHEET

UNIT NO. H☐☐-☐☐☐☐ JOB ORDER ☐☐________☐

DATE	MECH. INIT.	REPAIR CODE	HOURS	COMMENTS

QTY.	PARTS	COST	QTY.	PARTS	COST

REPAIR CODES

DRIVE TRAIN
01 Clutch/Torque Conv.
02 Main Transmission
03 Aux. Trans./Trans. Case
04 Drive Shaft/U-joints
05 Power Take Off
06 Differentials/Axles
07 Final Drive/Planetary

POWER PLANT
11 Air Intake System
12 Fuel System
13 Engine Repair – Minor
14 Engine Repair – Major
15 Cooling System
16 Exhaust System

MOUNTED EQUIPMENT
21 Hydraulic System
22 Plows/Sanders
23 Other Mounted Equip.

CAB & CHASSIS
31 Suspension System
32 Steering System
33 Brake System
34 Wheel/Hub/Bearings
35 Instruments/Gauges
36 Body Repair

ELECTRICAL
41 Ignition System
42 Starting System
43 Charging System
44 Lighting System

MISCELLANEOUS
51 Air Conditioner/Heater
52 Tires
53 Asphalt Equipment
54 Manuf./Fabricate
55 PM
56 Other

THAT'S IT! The Shop Job Order is complete.

EMS-0630

JOB ORDER SUMMARY

The data you enter on the Job Order is used to help manage the equipment fleet. Many of the entries on the Job Order are processed by computer, and are summarized on various EMS reports. Examples of information found in the reports are as follows:

- The "days down" will be summarized on various EMS reports. For example, it might show that sedans are available for use an average of 96% of the time, or that loaders are available 82% of the time. The same entries also identify specific units that are experiencing excessive downtime.

- The "repair code" and "labor hours" you enter are summarized and accumulated by unit. These entries raise such questions as:

  + Are the number of repairs on a specific unit becoming excessive? Should the unit be replaced?

- How is shop time being allocated? Where is the majority of the repair effort? And money?

- Does repetitious work in specific repair codes indicate component problems?

Most of the reports generated are one or two page summaries of essential information. A few detailed reports are also available to help equipment managers track down certain problems. Other reports are available on CICS terminals.

EMS-0640

E M S

SHOP JOB ORDER

DATA INPUT

INSTRUCTION MANUAL

SHOP JOB ORDER

Introduction

The Shop Job order allows the Department to gather information on repairs done to individual vehicles, such as the type of repair, hours required to make the repair, the date the repair was completed, downtime and other data.

The on line menu selection will give you access to the job order files.

On Line Access

Is your modem ready: ________

Enter User ID: ________

Enter Password: ________

Main Menu Selection: 3 (Equipment System)

Sub Menu Selection: 38 (Shop Job Order Program)

Shop Job Order Menu: 381 (Shop Job Order Detail Entry)

Shop Job Order

Entry and Transmission

Menu Selection:

Main Menu

3 - Equipment system

Sub Menu

38 - Shop job order programs

Shop Job Order Menu

381 - Shop job order detail entry
382 - Shop job order file transmission
383 - Shop job order file sort
384 - Restore shop job order file from backup
385 - Reset the shop job order file.

Shop Job Order Detail Entry:

menu selection - 381

After entering menu selection number 381, an image (Image No. 1) for entering job order data will appear on the screen. All fields that may be keyed into are zeroed except for the update type which is loaded with an "A". The cursor is positioned on job order.

DETAIL ENTRY DISPLAY SCREEN

```
381        Equipment      Shop Job Order
------------------------------------------------------------------------------

Update Type (A-ADD,C-CHANGE,D-DELETE):  A

              Job Order:     00-00000-0        Make & Model:

                Unit No:     00-0000                   Year:

                 MI/HRS:     000000         Beginning Odom:

             Days Down:      000  PM Level:  0

        Completion Date:     00/00/00

           Work Account:     0000


              Work Code(S-SCHEDULED,U-UNSCHEDULED):  0

 Location Code(C-COMMERCIAL,S-SHOP,R-ROADCALL):  0


                           R E P A I R   C O D E S

CODE     HOURS     CODE     HOURS     CODE     HOURS     CODE     HOURS
 00       000       00       000       00       000       00       000
 00       000       00       000       00       000       00       000
 00       000       00       000       00       000       00       000
 00       000       00       000       00       000       00       000
 00       000       00       000       00       000       00       000


Enter A(ADD),C(CHANGE),OR D(DELETE) for update type then enter job order also
enter unit number for A(ADD).  Enter "E" to end program.
```

Image No. 1

From the detail entry screen you may do any of the following: add (A) a record to the file, change (c) a record in the file, delete (D) a record from the file.

Add A Record

To add a record, type (A) enter a job order number (12000010) and unit number (000178) and press enter. (See Job Order on Page 6 for entry examples.) This will bring up the make, model and year of the vehicle on the screen to verify that it is a valid unit (Image 3) if the unit is in your master file. If the unit is not in your master file, a message will appear at the bottom of the screen. At this time you may change the unit number if you have entered an incorrect number or proceed by pressing the enter key until you progress to the MI/HRS: entry section of the screen. Now type in the rest of the data and press enter. The record will be added to the file and the original screen will appear.

COMPLETED SHOP JOB ORDER READY FOR ENTRY (Image No. 2)

STATE OF MONTANA			MONTANA DEPARTMENT OF HIGHWAYS
SHOP JOB ORDER			UNIT NO.
Make: Dodge	Model: Wagon		00-0178
Year: 83	Location:		JOB ORDER
Date Initiated: 12 / 21 / 83			12-00001-0
Date Completed: 12 / 23 / 83			MI/HRS
Authorization ___ - ______			003600
		DAYS DOWN	PM LEVEL
4260 ___ AWP _ _ _ _ AR _ _ _		002	1

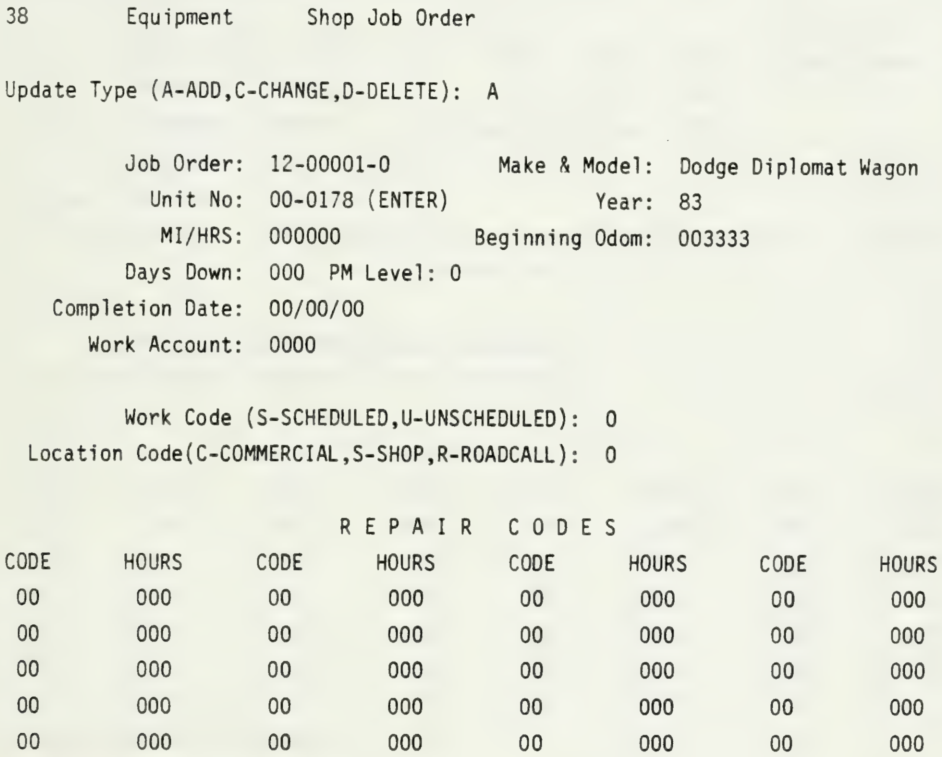
WORK CODE Scheduled x Unscheduled ___

LOCATION CODE Shop x Commercial ___ Road Call ___

Comments: Level I service required - U-joints need to be replaced.

Repair Code	Work to be Performed	Repairs Made	Mech. Inits.	Hours
55	PM Level I	Completed	JP	003
04	Replace U-Joints	Replaced	DS	008

Image No. 3 shows the screen after the job order number and the unit number have been entered. The make, model, year, and beginning odometer have been retrieved from the equipment master file after hitting enter. The make, model, year and beginning odometer as coded on the form can now be verified.



```
38        Equipment      Shop Job Order

Update Type (A-ADD,C-CHANGE,D-DELETE):  A

          Job Order:  12-00001-0         Make & Model:  Dodge Diplomat Wagon
            Unit No:  00-0178 (ENTER)            Year:  83
             MI/HRS:  000000           Beginning Odom:  003333
          Days Down:  000  PM Level: 0
    Completion Date:  00/00/00
       Work Account:  0000

          Work Code (S-SCHEDULED,U-UNSCHEDULED):  0
  Location Code(C-COMMERCIAL,S-SHOP,R-ROADCALL):  0

                            R E P A I R   C O D E S
CODE      HOURS      CODE      HOURS      CODE      HOURS      CODE      HOURS
 00        000        00        000        00        000        00        000
 00        000        00        000        00        000        00        000
 00        000        00        000        00        000        00        000
 00        000        00        000        00        000        00        000
 00        000        00        000        00        000        00        000
```

Image No. 4 shows all this data entered.

```
38        Equipment     Shop Job Order
-----------------------------------------------------------------------------------
Update Type(A-ADD,C-CHANGE,D-DELETE):  A

        Job Order:  12-00001-0        Make & Model:  Dodge Diplomat Wagon
          Unit No:  00-0178                   Year:  83
          MI/HRS:  003600         Beginning Odom:  003333
        Days Down:  002  PM Level:  1
  Completion Date:  12/23/83
     Work Account:  0000  (NOTE:  A work account is only entered if it is coded
                                  on the job order.)

          Work Code (S-SCHEDULED,U-UNSCHEDULED):  S
  Location Code(C-COMMERCIAL,S-SHOP,R-ROADCALL):  S

                               R E P A I R   C O D E S
CODE      HOURS     CODE      HOURS     CODE      HOURS     CODE      HOURS
 55        003       04        008       00        000       00        000
 00        00        00        000       00        000       00        000
 00        00        00        000       00        000       00        000
 00        00        00        000       00        000       00        000
 00        00        00        000       00        000       00        000
```

Enter the rest of the data.

The ENTER key is pressed and the record is checked for errors. If no errors are found, the record is added to the file and the original screen is displayed. If an error is found, a message will appear at the bottom of the screen explaining the problem. The cursor will be positioned to the field causing the problem.

Change a Record:

To change a job order record, first change the update Type to 'C', then type in the job order number you wish to change, then press the ENTER key.

The record will be displayed. You may now make any changes needed except to the job order number. Changes to the job number are explained later.

To remove a repair code which is presently on the record, change the repair code number to '00'.

An example follows:

EXAMPLE OF A CHANGE

The update type is changed from 'A' to 'C' and the job order number 11-0001-0 is entered (Image No. 5)

```
38        Equipment           Shop Job Order

Update Type(A-ADD,C-CHANGE,D-DELETE):  C

          Job Order:  11-00001-0               Make & Model:
            Unit No:  00-0000                          Year:
             MI/HRS:  000000                 Beginning Odom:
          Days Down:  000  PM Level: 0
    Completion Date:  00/00/00
       Work Account:  0000

           Work Code(S-SCHEDULED,U-UNSCHEDULED):  0
  Location Code(C-COMMERCIAL,S-SHOP,R-ROADCALL):  0

                            R E P A I R   C O D E S
CODE      HOURS      CODE      HOURS      CODE      HOURS      CODE      HOURS
 00        00         00        000        00        000        00        000
 00        00         00        000        00        000        00        000
 00        00         00        000        00        000        00        000
 00        00         00        000        00        000        00        000
 00        00         00        000        00        000        00        000
```

After the ENTER is pressed, the record is displayed (Image No. 6).

```
38        Equipment      Shop Job Order

Update Type(A-ADD,C-CHANGE,D-DELETE):  C

         Job Order:  11-00001-0           Make & Model:
           Unit No:  00-0171                      Year:
            MI/HRS:  000345            Beginning Odom:
         Days Down:  002  PM Level: 0
   Completion Date:  12/23/83
      Work Account:  0000

         Work Code(S-SCHEDULED,U-UNSCHEDULED):  S
Location Code(C-COMMERCIAL,S-SHOP,R-ROADCALL):  S

                             R E P A I R   C O D E S
CODE     HOURS      CODE     HOURS      CODE     HOURS      CODE     HOURS
 01       012        00       000        00       000        00       000
 00       000        00       000        00       000        00       000
 00       000        00       000        00       000        00       000
 00       000        00       000        00       000        00       000
 00       000        00       000        00       000        00       000
```

Key in changes for all but job order.

The changes to be made are:

(1) Delete the repair code '01'

(2) Add repair code '22' with 12 hours.

Image No. 7 shows these changes.

```
38        Equipment          Shop Job Order

Update Type (A-ADD,C-CHANGE,D-DELETE):  C

          Job Order:  11-00001-0            Make & Model:
            Unit No:  00-0171                       Year:
             MI/HRS:  000345             Beginning Odom:
          Days Down:  002 PM Level: 0
    Completion Date:  12-23-83
       Work Account:  0000

          Work Code (S-SCHEDULED,U-UNSCHEDULED):  S
 Location Code (C-COMMERCIAL,S-SHOP,R-ROADCALL):  S

                         R E P A I R   C O D E S

     CODE    HOURS    CODE    HOURS    CODE    HOURS    CODE    HOURS
      00      012      22      012      00      000      00      000
      00      000      00      000      00      000      00      000
      00      000      00      000      00      000      00      000
      00      000      00      000      00      000      00      000
      00      000      00      000      00      000      00      000

Key in changes for all but job order.
```

After pressing the ENTER key the record is checked for errors. If none are found the record is changed and the original screen is displayed. If an error is found, a message explaining the problem is displayed at the bottom of the screen and the cursor will be positioned to the field causing the problem.

Delete a Record

To delete a record, change the update type to 'D' and enter the job order number. After pressing the ENTER key the record will be displayed with the question 'DO YOU WANT TO DELETE THIS RECORD'. Type 'Y' for yes or 'N' for no.

If you answer yes, then the record is deleted and the original screen is displayed. If you answer no, the update is ignored and the original screen is displayed.

An example follows:

EXAMPLE DELETE

The update type is changed from 'A' to 'D' and job order order number 12-0001-0 is entered (Image No. 8).

```
38        Equipment           Shop Job Order

Update Type (A-ADD,C-CHANGE,D-DELETE):  D

          Job Order:  12-00001-0           Make & Model:
            Unit No:  00-0000                      Year:
             MI/HRS:  000000             Beginning Odom:
          Days Down:  000 PM Level: 0
    Completion Date:  00-00-00
       Work Account:  0000

          Work Code (S-SCHEDULED,U-UNSCHEDULED):  0
 Location Code (C-COMMERCIAL,S-SHOP,R-ROADCALL):  0

                              R E P A I R   C O D E S

     CODE     HOURS     CODE     HOURS     CODE     HOURS     CODE     HOURS
      00       000       00       000       00       000       00       000
      00       000       00       000       00       000       00       000
      00       000       00       000       00       000       00       000
      00       000       00       000       00       000       00       000
      00       000       00       000       00       000       00       000

Enter A(ADD),C(CHANGE),OR D(DELETE) for update type then enter job order
number.  Also enter unit number for A(ADD).  Enter "E" to end program
```

The complete record is displayed with the question 'DO YOU WANT TO DELETE THIS RECORD?'

The cursor is positioned after the question (Image No. 9).

```
38        Equipment           Shop Job Order

Update Type (A-ADD,C-CHANGE,D-DELETE):  D

          Job Order:  12-00001-0          Make & Model:  Dodge
            Unit No:  00-0178                     Year:  83
             MI/HRS:  003600           Beginning Odom:  003333
          Days Down:  002 PM Level: 1
    Completion Date:  12-23-83
       Work Account:  0000

          Work Code (S-SCHEDULED,U-UNSCHEDULED):  S
 Location Code (C-COMMERCIAL,S-SHOP,R-ROADCALL):  S

                          R E P A I R   C O D E S

     CODE     HOURS     CODE     HOURS     CODE     HOURS     CODE     HOURS
      55       003       04       008       00       000       00       000
      00       000       00       000       00       000       00       000
      00       000       00       000       00       000       00       000
      00       000       00       000       00       000       00       000
      00       000       00       000       00       000       00       000

Do you want to delete this record? ___
```

In this example the replay is <u>yes</u> (Image No. 10).

```
38        Equipment            Shop Job Order

Update Type (A-ADD,C-CHANGE,D-DELETE):  D

          Job Order:  12-00001-0            Make & Model:  Dodge
            Unit No:  00-0178                       Year:  83
             MI/HRS:  003600             Beginning Odom:  003333
          Days Down:  002 PM Level: 1
    Completion Date:  12-23-83
       Work Account:  0000

          Work Code (S-SCHEDULED,U-UNSCHEDULED):  S
 Location Code (C-COMMERCIAL,S-SHOP,R-ROADCALL):  S

                           R E P A I R   C O D E S

     CODE    HOURS    CODE    HOURS    CODE    HOURS    CODE    HOURS
      55      003      04      008      00      000      00      000
      00      000      00      000      00      000      00      000
      00      000      00      000      00      000      00      000
      00      000      00      000      00      000      00      000
      00      000      00      000      00      000      00      000

Do you want to delete this record? _Y__
```

Image No. 10

The record is deleted and the original screen is displayed.

ENDING THE PROGRAM

To end the program, enter an 'E' in the first byte of the Job Order Number.

(Image No. 11)

```
38        Equipment           Shop Job Order

Update Type (A-ADD,C-CHANGE,D-DELETE):  A

          Job Order:  E0-00000-0          Make & Model:
            Unit No:  00-0000                     Year:
             MI/HRS:  000000            Beginning Odom:
          Days Down:  000 PM Level: 0
      Completion Date:  00-00-00
       Work Account:  0000

          Work Code (S-SCHEDULED,U-UNSCHEDULED):  0
 Location Code (C-COMMERCIAL,S-SHOP,R-ROADCALL):  0

                         R E P A I R   C O D E S

     CODE     HOURS     CODE     HOURS     CODE     HOURS     CODE     HOURS
      00       000       00       000       00       000       00       000
      00       000       00       000       00       000       00       000
      00       000       00       000       00       000       00       000
      00       000       00       000       00       000       00       000
      00       000       00       000       00       000       00       000

Enter A(ADD),C(CHANGE),OR D(DELETE) for update type then enter job order number.
Also enter unit number for A(ADD).  Enter "E" to end program.
```

ERRORS

In general, error messages listed at the bottom of the screen are self-explanatory. If, however, you are unsure of the problem, this list may help you.

The following messages are broken down by field starting with the update type and going down the screen to the repair codes. The message, the reason for the message, and possible solutions will appear as follows:

1. UPDATE TYPE

   MESSAGE: INVALID UPDATE TYPE REQUESTED
   PROBLEM: The update type entered is not an 'A', 'C', or 'D'
   SOLUTION: Correct to a valid update type.

2. JOB ORDER NUMBER

   A. GENERAL
   MESSAGE: JOB NUMBER MUST BE NUMERIC
   PROBLEM: A non-numeric character was entered in the job number.
   SOLUTION: Re-enter the job order number.

   MESSAGE: JOB NUMBER WAS NOT ENTERED
   PROBLEM: All zeroes were found in the job order number.
   SOLUTION: Enter the job order number.

   B. WHEN ADDING
   MESSAGE: THIS JOB NUMBER ALREADY EXISTS
   PROBLEM: You are trying to add a job order that already exists.
   SOLUTION: Decide if update type or job order number is incorrect then re-enter this field.

   C. WHEN CHANGING OR DELETING
   MESSAGE: THE SHOP JOB ORDER NUMBER WAS NOT FOUND
   PROBLEM: The job order number that you are trying to change or delete is not on file.
   SOLUTION: Re-enter the job order number or change the update type to 'A' to add the record.

3. UNIT NUMBER

A. GENERAL

MESSAGE: WARNING - THIS UNIT NUMBER WAS NOT FOUND ON THE MASTER FILE. YOU MAY LEAVE IT AS IS OR CHANGE IT.

PROBLEM: The unit entered was not in the equipment master file. You may have entered the wrong unit number or the equipment master file has not been changed to include this unit.

SOLUTION: If the number was entered incorrectly, re-enter the unit number. Otherwise, press ENTER to continue.

B. ADDING

MESSAGE: UNIT NUMBER MUST BE SPECIFIED WHEN DOING AN ADD.

PROBLEM: You are attempting to add a record but you haven't entered the unit number.

SOLUTION: Enter the unit number.

4. MILES/HOURS

MESSAGE: MILES/HOURS MUST BE NUMERIC.

PROBLEM: A non-numeric character was entered in the MILES/HOURS field.

SOLUTION: Re-enter the miles/hours.

5. DAYS/DOWN

MESSAGE: DAYS DOWN MUST BE NUMERIC

PROBLEM: A non-numeric character was entered in the DAYS DOWN field.

SOLUTION: Re-enter the DAYS DOWN field.

6. PM LEVEL

MESSAGE: INVALID PM LEVEL

PROBLEM: A character other than '0', '1', or '2' was entered in the PM level field.

SOLUTION: Re-enter the PM level.

MESSAGE: INVALID PM LEVEL FOR A REPAIR CODE OF 55

PROBLEM: Repair code of 55 was entered, but a PM Level of '1', or '2' was not.

SOLUTION: Determine if the PM level is in error or if a repair code of 55 should not have been entered. Correct the field that is in error.

7. COMPLETION DATE

MESSAGE: INVALID DATE ENTERED

PROBLEM: The completion date is not in a valid month, day, year format.

SOLUTION: Re-enter the completion date.

8. ACCOUNT NUMBER

MESSAGE: INVALID ACCOUNT NUMBER

PROBLEM: A non-numeric character was entered in the account field.

SOLUTION: Re-enter the account number.

9. WORK CODE

MESSAGE: INVALID WORK CODE

PROBLEM: A character other than a 'S' or 'U' was entered in the work code.

SOLUTION: Re-enter the work code.

10. LOCATION CODE

MESSAGE: INVALID LOCATION CODE

PROBLEM: A character other than a 'C', 'S', or 'R' was entered in the location code.

SOLUTION: Re-enter the location code.

11. REPAIR CODES

MESSAGE: THERE WERE NO REPAIR CODES ENTERED FOR THIS RECORD

PROBLEM: All repair codes are zero

SOLUTION: Enter at least one repair code.

MESSAGE: INVALID REPAIR CODE

PROBLEM: Either you are adding a record and you entered hours but no repair code, or the repair code you entered is not valid.

SOLUTION: Re-enter the repair code or if the repair code was not entered, either zero out the hours or enter a repair code.

MESSAGE: A repair code of 55 is needed for a PM level of '1' or '2'.

PROBLEM: A PM level of '1' or '2' was coded but a repair code of 55 was not.

SOLUTION: Determine if the PM level is in error. If it is, then enter a zero in the PM level field. If it isn't, check to see if you incorrectly entered another repair code. (i.e. a 54 instead of 55). If you have, re-enter this repair code. If you haven't, enter a repair code of 55.

12. HOURS

MESSAGE: INVALID HOURS CODED

PROBLEM: Either a non-numeric character has been entered in the hours field or zero hours were coded for a repair code.

SOLUTION: If a non-numeric was entered then re-enter the hours. If zero hours is the problem, then either code the hours field or zero the repair code.

Any other error encountered will require the assistance of a Programmer. Contact headquarters for help.

PF KEYS

PF3

The PF 3 KEY may be used to return you to your original screen. Any update that is in progress will be ignored.

PF4

The PF4 key may be used to browse through the shop job order file. If the PF4 key is used the next record on file will be displayed.

If after seeing the record you wish to change or delete it, enter the appropriate update type and press ENTER. The record will be displayed again. Follow the rules for changing or deleting a record.

Unlike the PF3 key, the PF4 key does not cause an update to be ignored.

If the PF4 key is used when the last record on file is displayed, the first record will reappear.

SHOP JOB ORDER TRANSMISSION

menu selection - 382

The shop job order files should be transmitted to Helena approximately once a week.

After entering menu selection 382, the following will appear on the screen.

```
     38   Shop Work Order Transmission

Do you want to send the shop work order records (Y or N)?
```

Type 'Y' for yes and 'N' for no.

```
     38   Shop Work Order Transmission

Do you want to send the shop work order records (Y or N)?  Y
```

The records are then transmitted.

If the records transmitted are error free and are received, confirmation from the 3033 is sent back to you and the Shop Job Order file will be emptied. If you do not receive confirmation, contact Data Processing prior to going to menu selection 385. They will assist you in reseting your Shop Job Order file.

SORT FOR SHOP JOB ORDER FILE

menu selection - 383

The shop job order file is automatically sorted after the detail entry program ends.

If you need to sort this file without the use of the detail entry program, enter 383 for the menu selection and the file will be sorted.

RESTORING SHOP JOB ORDER FILE FROM BACKUP

menu selection - 384

It may become necessary to restore the Shop Job order file. This should only be done on request from Headquarters.

If this has to be done, enter menu selection 384. The program will ask if you want to proceed.

If you answer YES the backup file will become your new Shop Job order file. If you answer NO the program will end.

RESET THE SHOP JOB ORDER FILE

menu selection - 385

After the Shop Job order records are transmitted, confirmation from the 3033 will be sent back and the Shop Job order file will be emptied. If confirmation is not made, your file will be left in a status that will not allow you to enter or retransmit it.

Since failure to confirm is a result of some error on the file, the file must either be retransmitted or corrected. To do this, the status of the file must be set back the way it was before transmission by entering menu selection 385.

A question will be displayed asking if you wish to reset the Shop Job order file.

Answer Yes ('Y'). You may now retransmit or correct the file.

EMS-0700
Preventive Maintenance

The objective of this Section of the manual is to define preventive maintenance and identify responsibilities, procedures and service intervals.

I. DEFINITION OF PREVENTIVE MAINTENANCE

Preventive maintenance is the systematic care, servicing and inspection of equipment to ensure a serviceable condition and to detect and correct failures before they become major repairs and to extend the serviceable life.

II. PROGRAM OBJECTIVES

To ensure that preventive maintenance is accomplished in a uniform manner and in accordance with established schedules.

III. PREVENTIVE MAINTENANCE SCHEDULES

P/M schedules have been developed from procedures outlined in operators' manuals and from manufacturer's recommendations. Additional requirements have also been added, based on past Department maintenance records and experience. The procedures are general and cover most equipment. The interval for performing a P/M may be reduced if operating conditions warrant. For specific instructions, refer to the operator's manual or manufacturer's service manual for that piece of equipment.

IV. RESPONSIBILITY

Proper care and maintenance of the fleet rests with the entire organization from the operator to the Department Director. Each District Engineer, Maintenance Chief and Maintenance Superintendent will delegate the responsibilities of preventive maintenance to the first line supervisor and he/she will delegate actual performance of the work to the operators.

The following definitions and procedures shall apply to the P/M program:

- P/M Daily -- This is the daily responsibility of the operator of each vehicle or piece of equipment.
- P/M Level I -- Are regularly required service intervals as herein defined and are the responsibility of the operator under the direction of the immediate supervisor.
- P/M Level II -- Are scheduled major services performed by the shops on all vehicles and equipment.
- Vehicle Inspection -- All vehicles and equipment will be inspected during normal scheduled shop services or annual inspections for general condition, Level I P/M performance, and repair requirements. A copy of each review will be retained in a shop file.

Operator's Daily Check

Equipment Classes (00-17)

DO NOT operate an unsafe vehicle.

I. BEFORE OPERATION

- Check engine oil level
- Check radiator coolant level
- Check tires for low pressure or flats
- Check all lights
- Check accessories such as windshield wipers, horn, mirror and seat belts
- Check hand and foot brakes
- Keep windows clean

II. DURING OPERATION

- Be aware of unusual noises
- Check all gauges for proper operation
- Be alert for problems regarding steering, braking and tires out of balance

III. AFTER OPERATION

- Leave vehicle clean
- Fill the fuel tank
- Report any problems to supervisor

Daily checks are general in nature and every item may not apply to every class.

Operator's Daily Check

Equipment Classes (19-65)
(Self Propelled Units)

DO NOT operate unsafe equipment.

I. BEFORE OPERATION

- Check brakes and drain air tanks
- Check all operation and safety lights
- Check parking brake
- Check engine oil
- Check all belts
- Check coolant level (radiator and surge tank)
- Check tires for low air pressure, flats, cuts and breaks
- Check accessories such as windshield wipers, horn, mirrors and seat belts
- Keep windows clean
- Check/drain fuel/water separator
- Lubricate daily lube points

II. DURING OPERATION

- Be aware of unusual noises or operating conditions
- Be alert for problems regarding steering, braking and tires out of balance
- Check all gauges for proper operation

III. AFTER OPERATION

- Leave unit clean
- Fill the fuel tank - do not overfill with cold fuel before putting unit into a warm building.
- Report deficiencies to supervisor
- Drain air tanks

Daily checks are general in nature and every item may not apply to every class.

Operator's Daily Check

Stationary and Auxiliary Engines

I. BEFORE OPERATION

- Visual inspection of engine and mount
- Check oil level
- Check coolant level
- Check air cleaner
- Check fan belts

II. DURING OPERATION

- Be aware of unusual noises or operating conditions
- Check all gauges for proper operation
- Keep clean

III. AFTER OPERATION

- Fill the fuel tank
- Report deficiencies to supervisor

Operator's Daily Check

Trailers and Other Towed Units

I. BEFORE OPERATION

- Perform visual inspection
- Check tires for proper inflation, flats, cuts and breaks
- Check hitch, tie-down chains, brakes, safety chains and lights
- Check for air leaks; wait for trailer air tanks to change before moving

II. DURING OPERATION

- Be aware of unusual noises or operating conditions
- Check load and binders
- Check hitch locking pins

III. AFTER OPERATION

- Report deficiencies to supervisor

Daily checks are general in nature and every item may not apply to every class.

PREVENTIVE MAINTENANCE

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PREVENTIVE MAINTENANCE SCHEDULE

Passenger Vehicles
Classes 00, 06

SERVICE		Daily
RESPONSIBILITY		Operator
REQUIRED ACTION		Perform daily check, cleans and fuel unit.

LEVEL I SERVICE		Perform Service every 5000 miles.
RESPONSIBILITY		Operator/Department Shop/Commercial Garage.
REQUIRED ACTION	Lube:	Chassis and drive train.
	Change:	Engine oil and oil filter.
	Service:	Air cleaner (replace if necessary) battery terminals and cables.
	Rotate:	Rotate and balance tires if necessary.
	Check:	A. Battery water level (unless maintenance free type) B. Fluid levels including radiator and over flow canister, power steering, automatic transmission, brake, windshield washer, transmission, differential and transfer case. C. Fan belts for correct tension or excessive wear. D. Radiator, heater and power steering hoses for leaks. E. Condition of windshield wiper blades as well as condition of windshield.

REQUIRED ACTION (continued)

F. Vehicle exterior for damage and headlights, turn signal lights, brake lights and emergency flashers.

G. Tires for proper inflation, wear cuts or breaks (including the spare).

H. Vehicle interior for cleanliness, dash instruments, dome light and clean windshield.

I. Undercarriage, drivelines, and cv boots and exhaust system for damage.

Report: Deficiencies to your supervisor.

PREVENTIVE MAINTENANCE SCHEDULE
Passenger Vehicles
Classes 00, 06

LEVEL II SERVICE	Perform service every 20,000 miles.
RESPONSIBILITY	Department shop
ACTIONS	Complete all items under Level I Service.

Est. Hrs. 2.0	CHECK:	Emission control system, tires, front end alignment, power steering pump, radiator cap pressure and other accessories.
Est. Hrs. 2.5	REPLACE:	Engine air filter, spark plugs, engine fuel filter, transmission fluid and filter, transfer case and gear box oil, PCV valve and belts as necessary.
Est. Hrs. 2.0	PERFORM:	Engine scope check (includes ignition, charging and starting system, carburetor adjustment and review trouble codes).
Est. Hrs. 2.0	PACK:	Front and/or rear wheel bearings. Replace seals and brakes as necessary.
Est. Hrs. 0.5	INSPECT:	Universal or cvc joints, body and engine mounts, shock absorbers and springs.
Est. Hrs. 1.5	EVERY 40,000:	Drain and flush cooling system. Install new 50/50 solution. Rebuild alternator and starter.
Est. Hrs. 0.5	ROAD TEST:	Test drive to ensure satisfactory operation.
Est. Hrs. 0.0	REPORT:	Deficiencies to Shop Superintendent

Tot. Est.
Hours 11.0

Preventive Maintenance Schedule

Light Trucks
Classes: 02, 03, 07-12

SERVICE		Daily
RESPONSIBILITY		Operator
REQUIRED ACTION		Performs daily check, cleans and fuel unit.

LEVEL I SERVICE		Perform Service every 3000 miles.
RESPONSIBILITY		Operator/Department Shop/Commercial Garage.
REQUIRED ACTION	Lube:	Chassis and drive train.
	Change:	Engine oil and oil filter.
	Service:	Air cleaner (replace if necessary) battery terminals and cables.
	Rotate:	Rotate and balance tires if necessary.
	Check:	A. Battery water level (unless maintenance free type) B. Fluid levels including radiator and over flow canister, power steering, automatic transmission, brake, windshield washer, transmission, and differential. C. Fan belts for correct tension or excessive wear. D. Radiator, heater and power steering hoses for leaks. E. Condition of windshield wiper baldes as well as condition of windshield. F. Vehicle exterior for damage and headlights, turn signal lights, brake lights and emergency flashers.

REQUIRED ACTION (continued)

G. Tires for proper inflation, wear cuts or breaks (including spare).

H. Vehicle interior for cleanliness, dash instruments, dome light and clean windshield.

I. Undercarriage, drivelines, and cv boots and exhaust system for damage.

Report: Deficiencies to your supervisor.

Preventive Maintenance Schedule

Light Trucks
Classes: 02, 03, 07-12

LEVEL II SERVICE	Perform service every 20,000 miles.
RESPONSIBILITY	Department shop
ACTIONS	Complete all items under Level I Service.

CHECK:	Emission control system, tires, front end alignment, power steering pump, radiator cap pressure and other accessories.	Est. Hrs. 2.0
REPLACE:	Engine air filter, spark plugs, engine fuel filter, transmission fluid and filter, transfer case and gear box oil, PCV valve and belts as necessary.	Est. Hrs. 2.5
PERFORM:	Engine scope check (includes ignition, charging and starting system, carburetor adjustment, and review trouble codes).	Est. Hrs. 2.0
PACK:	Front and/or rear wheel bearings. Replace seals and brakes as necessary.	Est. Hrs. 2.5
INSPECT:	Universal or cvc joints, body and engine mounts, shock absorbers and springs.	Est. Hrs. 0.5
EVERY 40,000:	Drain and flush cooling system. Install new 50/50 solution. Rebuild alternator and starter	Est. Hrs. 1.5
ROAD TEST:	Test drive to ensure satisfactory operation.	Est. Hrs. 0.5
REPORT:	Deficiencies to Shop Superintendent	Est. Hrs. 0.0

Tot. Est. Hours 11.0

JH:1:lrk:21G-11

Preventive Maintenance Schedule

Medium and Heavy Trucks
Classes: 19-29

SERVICE		Daily
RESPONSIBILITY		Operator
REQUIRED ACTION		Performs daily check, cleans and fuel unit.

LEVEL I SERVICE		Perform Service every 3000 miles.
RESPONSIBILITY		Operator/Department Shop/Commercial Garage.
REQUIRED ACTION	Lube:	Chassis and drive train.
	Change:	Engine oil and oil filter.
	Service:	Air cleaner (replace if necessary) and precleaner, battery terminals and cables.
	Rotate:	Rotate and balance tires if necessary.
	Check:	A. Battery water level (unless maintenance free type), drain fuel water separator.
		B. Fluid levels including radiator and over flow canister, power steering, hydraulic tank, brake, windshield washer, transfer case, transmission, and differential.
		C. Fan belts for correct tension or excessive wear.
		D. Radiator, heater and power steering hoses for leaks. Hydraul lines, hoses and fittings.
		E. Condition of windshield wiper blades as well as condition of windshield.

REQUIRED ACTION (continued)

F. Vehicle exterior for damage and headlights, turn signal lights, brake lights and emergency flashers.

G. Tires for proper inflation, wear cuts or breaks (including spare) and inner and outer lug nuts.

H. Vehicle interior for cleanliness, dash instruments, dome light, clean windshield and clutch adjustment.

I. Undercarriage, drivelines, exhaust system for damage, spring hangers and U-bolts.

Report: Deficiencies to your supervisor.

Preventive Maintenance Schedule

Medium and Heavy Trucks
Classes: 19-29

LEVEL II SERVICE	Perform service every 20,000 miles.
RESPONSIBILITY	Department shop
REQUIRED ACTION	Complete all items under Level I Service.

	CHECK:	Tires for match, appropriate rims on the front, steering - king pins, tie rods, alignment, power steering pump, hoses, radiator cap pressure and other accessories.
Est. Hrs. 3.0		
	REPLACE:	Service air cleaner (replace if necessary), fuel, water, transmission, hydraulic filters, all belts, PCV valve, drain and refill transmission, transfer case and gear boxes.
Est. Hrs. 6.0		
	PERFORM:	Gas - engine scope (includes ignition, parts, plugs, carburetor adjustment).
	Diesel:	Engine - run rack at 1st PM II and every other PM II unless problems are experienced. Check throttle linkage and governor play and turbocharger end play.
	Both:	Air compressors, lines, and pulleys.
Est. Hrs. 4.0		
	PACK:	Pull wheels, wheel bearings, replace seals, check brakes front and rear, replace air brake can diaphrams.
Est. Hrs. 8.0		

INSPECT: Universal joints and carrier bearings, body and engine mounts, shock absorbers, springs, radiator supports, dump box subframe, body and hinges, 5th wheel (if equipped) and inspect brakes (replace if necessary), clutch adjustment if necessary.

Est. Hrs. 2.0

TEST: Cooling System - During warranty period, follow factory recommendations on draining and flushing cooling systems. Using new solution, bring cooling system to a minus 30 degrees Fahrenheit. Add additive as needed.

EVERY 40,000: Drain and flush cooling system. Install new 50/50 solution.

Est. Hrs. 0.5

REBUILD: Alternators and starters (check and repair as necessary).

Est Hrs. 3.0

HYDRAULIC: Check hydraulic flow at sander and plow outlets and all lines and hoses.

Est Hrs. 0.5

LIGHTING: Check all driving and safety lighting.

Est Hrs. 0.5

ROAD TEST: Test drive to ensure satisfactory operation.

Est. Hrs. 0.5

REPORT: Deficiencies to Shop Superintendent

Est Hrs. 0.0

Tot. Est.
Hours 28.0

Preventive Maintenance Schedule

Tractor with Mowers
Classes: 33

SERVICE		Daily
RESPONSIBILITY		Operator
REQUIRED ACTION		Performs daily check, cleans and fuel unit. Lubricate every 4 hours of operation.

LEVEL I SERVICE		Perform service every 100 hours usage.
RESPONSIBILITY		Operator/Department Shop/Commercial Garage.
REQUIRED ACTION	Lube:	Steering, suspension points, control levers, steering cylinder, pivot points, drive shafts, universal joints, and any attachments (mowers, bucket pins, PTO drive shafts).
	Change:	Engine oil and oil filter.
	Service:	Air cleaner (replace if necessary) battery terminals and cables.
	Check:	A. Battery water level (unless maintenance free type) B. Fluid levels including radiator and over flow canister, power steering, brakes, transmission, differential, and hydraulic tanks. C. Fan belts for correct tension or excessive wear. D. Radiator, hydraulic and power steering hoses for leaks. E. Exterior for damage and headlights, SMV sign and emergency flashers. F. Tires for proper inflation, wear cuts or breaks.

G. Operators position for cleanliness, instrument operation.

H. Undercarriage, drivelines, and exhaust system for damage.

Report: Deficiencies to your supervisor.

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Preventive Maintenance Schedule

Tractor with Mowers
Classes: 33

LEVEL II SERVICE — Perform service every 500 usage hours or once a year.

LEVEL II SERVICE	Perform service every 500 usage hours or once a year.
RESPONSIBILITY	Department shop
ACTIONS	Complete all items under Level I Service.
CHECK:	Steering (including pump, hoses, king pins, tie rods and alignment), tires for match, wear, brakes and clutch adjustment, PTO drives and hydraulic hoses.
Est. Hrs. 1.5	
REPLACE:	Engine air filter, engine fuel filter, transmission fluid and filter, transfer case and gear box oil, PCV valve and belts as necessary.
Est. Hrs. 3.0	
PERFORM:	Gas - Engine tuneup (includes ignition, charging and starting system and carburetor adjustment).
Diesel:	Engine run rack at 1st PM II and every other unless problems are experienced. Check throttle linkage and Governor play, and turbocharger end play.
Est. Hrs. 3.0	
PACK:	Front and/or rear wheel bearings. Replace seals and brakes as necessary.
Est. Hrs. 1.0	
INSPECT:	Body and motor mounts, radiator supports, brake adjustments, air induction system for leaks, fan belt tension and wear, all lighting.
Est. Hrs. 2.5	

ACCESSORIES: Universal joints, hoses, tanks, wear plates, knives, etc.

Est. Hrs. 1.0

ROAD TEST: Test machine and attachments to ensure satisfactory operation.

Est. Hrs. 0.5

REPORT: Deficiencies to Shop Superintendent

Est. Hrs. 0.0

Tot. Est.
Hours 12.5

JH:1:lrk:21G-20

Preventive Maintenance Schedule

Motor Graders/Loaders
Classes: 30 & 32

SERVICE	Daily
RESPONSIBILITY	Operator
REQUIRED ACTION	Performs daily check, cleans and fuel unit.

LEVEL I SERVICE		Perform Service every 200 usage hours or 100 hour meter hours.
RESPONSIBILITY		Operator/Department Shop/Commercial Garage.
REQUIRED ACTION	Lube:	Steering, suspension points, control levers, steering cylinders, pivot points, drive shafts, universal joints and any attachments.
	Change:	Engine oil and oil filter.
	Service:	Air cleaner (replace if necessary) battery terminals and cables.
	Check:	A. Battery water level (unless maintenance free type).
		B. Fluid levels including radiator and over flow canister, power steering, automatic transmission, brake, windshield washer, transmission, differential, final drives and hydraulics.
		C. Fan belts for correct tension or excessive wear.
		D. Radiator, heater and power steering hoses for leaks.
		E. Condition of winchsield wiper blades as well as condition of windshield and other glass.

F. Unit exterior for damage, work lights, emergency flashers, and safety lights.

G. Tires for proper inflation, wear cuts or breaks.

H. Unit interior for cleanliness, dash instruments, clean windshield.

Report: Deficiencies to your supervisor.

Preventive Maintenance Schedule

Motor Graders/Loaders
Classes: 30 & 32

LEVEL II SERVICE	Perform service every 2000 usage hours or 1000 hour meter hours.
RESPONSIBILITY	Department shop
ACTIONS	Complete all items under Level I Service.

Est. Hrs. 8.0	CHECK:	Steering (including pump, hoses, king pins, tie rods and alignment), tires for match, wear, and breaks, clutch adjustment, hydraulic hoses, brakes, turning circle adjustment and wear, bucket and articulation pins for wear, and tandem drive chains.
Est. Hrs. 8.0	REPLACE:	Engine air, fuel, and water filters, transmission fluid and filter, transfer case and gear box oil, and all belts as necessary.
Est. Hrs. 8.0	PERFORM:	Gas - Engine tuneup (includes ignition, charging and starting system and carburetor adjustment).
	Diesel:	Engine run rack at 1st PM II and every other unless problems are experienced. Check throttle linkage and Governor play, and turbocharger end play.
Est. Hrs. 4.0	PACK:	Front and/or rear wheel bearings. Replace seals and brakes as necessary.

INSPECT: Body and motor mounts, radiator supports, brake adjustments, air induction system for leaks, fan belt tension and wear, universal joints, all glass and sheet metal and cutting edges and wear plates, hydraulic tanks and lines, and all lighting.

Est. Hrs. 1.0

REBUILD: Alternators and starters (check and repair as necessary).

Est. Hrs. 6.0

ROAD TEST: Test machine and attachments to ensure satisfactory operation.

Est. Hrs. 0.5

REPORT: Deficiencies to Shop Superintendent.

Est. Hrs. 0.0

Total Est.
Hours 35.5

EMS-0725

Preventive Maintenance Schedule

Rollers
Classes: 31

SERVICE		Daily
RESPONSIBILITY		Operator
REQUIRED ACTION		Performs daily check, cleans and fuels unit.

LEVEL I SERVICE		Perform Service every 100 hours usage or 50 hour meter hours.
RESPONSIBILITY		Operator/Department Shop/Commercial Garage
REQUIRED ACTION:	Lube:	Steering, suspension points, control levers, steering cylinders, pivot points, drive shafts, universal joints and any attachments.
	Change:	Engine oil and oil filter.
	Service:	Air cleaner (replace if necessary) battery terminals and cables.
	Check:	A. Battery water level (unless maintenance free type). B. Fluid levels including radiator and over flow canister, power steering, automatic transmission, brake, transmission, differential and hydraulic. C. All belts and chains for correct tension or excessive wear. D. Water tank for leaks or breaks. E. Unit exterior for damage and working, emergency flashers, and safety lights. F. Tires for proper inflation, wear cuts or breaks (including the spare) and compression rolls for damage.

G. Unit interior for cleanliness, dash and instruments.

Report: Deficiencies to your supervisor.

Preventive Maintenance Schedule

Rollers
Classes: 31

LEVEL II SERVICE	Perform service once a year.
RESPONSIBILITY	Department shop
ACTIONS	Complete all items under Level I Service.

Est. Hrs. 2.0	CHECK:	Tires for match, steering cylinders, pumps, hoses, brakes and clutch.
Est. Hrs. 3.0	REPLACE:	Service air cleaner (replace if necessary), fuel, water, transmission, hydraulic filters, all belts, drain and refill differentials, transmission, transfer case and gear boxes.
Est. Hrs. 1.5	PERFORM:	Gas - Engine tuneup (includes ignition, parts, plugs and carburetor adjustment).
	Diesel:	Engine run rack at 1st PM II and every other PM II unless problems are experienced. Check throttle linkage and governor play, and turbocharger end play.
Est. Hrs. 2.0	PACK:	Pull wheels, wheel bearings, replace seals, check brakes.

	INSPECT:	Universal joints, body and engine mounts, hydraulic system and water tanks for leaks and hoses for wear, articulation points, drums and tires for wear, drive chains and gears, pintal eyes and safety chains. Flush water tank.
Est. Hrs. 2.0		
	OPERATIONS TEST:	Test machine and attachments to ensure operational and that the unit is ready to return to service.
Est. Hrs. 0.5		
	REPORT:	Deficiencies to Shop Superintendent.
Est. Hrs. 0.0		

Total Est.
Hours 11.0

Preventive Maintenance Schedule

Self-Propelled Sweepers
Classes: 42-4

SERVICE — Daily

RESPONSIBILITY — Operator

REQUIRED ACTION — Performs daily check, cleans and fuels unit and inspects all brooms. Grease daily or more frequently if required.

LEVEL I SERVICE — Perform Service every 100 hours or sooner if factory recommends.

RESPONSIBILITY — Operator/Department Shop/Commercial Garage

REQUIRED ACTION:

Lube: Steering, suspension, all controls, pivot points, drive shafts, and hinge pins.

Change: Engine(s) oil and filter, and pickup and gutter brooms if necessary.

Service: Air cleaner(s) (replace if necessary) battery terminals and cables.

Check:

A. Battery water level (unless maintenance free type).

B. Fluid levels including radiator(s), overflow canister, power steering, transmission, differentials, hydraulic system, brake and windshield washer.

C. Fan belts and chains for tension and wear.

D. Radiator, heater and power steering lines and hydraulic lines and hoses for wear.

E. Condition of windshield wiper blades as well as condition of other glass.

F. Water tank and lines, gutter and sweeper brooms, conveyor flights and chains, collection hopper condition and wear shoes.

G. Unit interior for damage, work and safety lights and flashers.

H. Tires for proper inflation and wear or cuts.

I. Unit interior for cleanliness, dash instruments, and clean windshield.

Inspect: Air intake system for loose hoses or fittings.

Report: Report any deficiencies to your supervisor.

Preventive Maintenance Schedule

Self-Propelled Sweepers
Classes: 42-4

LEVEL II SERVICE	Perform service every 500 hours or once a year.
RESPONSIBILITY	Department shop
ACTIONS	Complete all items under Level I Service.

	CHECK:	Tires for match, steering - king pins, tie rods, alignment, power steering pump and hoses, radiator cap pressure and other accessories.
Est. Hrs. 3.0		
	REPLACE:	Service air cleaner (replace if necessary), fuel, water, transmission, hydraulic filters, all belts, PVC valve, drain and refill transmission, transfer case and gear boxes.
Est. Hrs. 6.0		
	PERFORM:	Gas - engine tuneup (includes ignition, parts, plugs and carburetor adjustment).
	Diesel:	Engine run rack at 1st PM II and every other PM II unless problems are experienced. Check throttle linkage and governor play, and turbocharger end play.
Est. Hrs. 4.0		
	PACK:	Pull wheels, wheel bearings, replace seals, check brakes front and rear.
Est. Hrs. 8.0		

INSPECT: Universal joints and carrier bearings, body and engine mounts, shock absorbers, springs and radiator supports.

Est. Hrs. 2.0

EVERY YEAR: Drain and flush cooling system. Install new 50/50 solution.

Est. Hrs. 0.5

ROAD TEST: Test drive to ensure satisfactory operation.

Est. Hrs. 0.5

REPORT: Deficiencies to Shop Superintendent.

Est. Hrs. 0.0

Total Est.
Hours 24.0

Preventive Maintenance Schedule

Snow Blowers
Classes: 54's

SERVICE		Daily
RESPONSIBILITY		Operator
REQUIRED ACTION		Performs daily check, keep unit clean, inspect cutting edge, casting chute, wear shoes, drive lines and chains, leaks in hydraulic lines or fittings. Grease daily or more often if required.

LEVEL I SERVICE		Perform Service every 200 usage hours or sooner if factory recommends.
RESPONSIBILITY		Operator/Department Shop/Commercial Garage.
REQUIRED ACTION	Lube:	Steering, suspension, controls pivot points, drive shafts, hinge points, gears, bearings and drive chains.
	Change:	Engine oil and oil filter.
	Service:	Air cleaner (replace if necessary) battery terminals and cables.
	Check:	A. Battery water level (unless maintenance free type). B. Fluid levels including radiator(s), over flow canisters, power steering, transmission, differentials, hydraulic systems, brake, and windshield. C. Fan belts and drive chains for tension and wear. D. Radiator(s), heater and power steering lines and hydraulic lines and hoses for wear. E. Condition of windshield wiper blades as well as condition of other glass.

F. Wear components for replacement.

G. Unit exterior for damage, work and safety lights.

H. Tires for proper inflation and wear or cuts.

I. Unit interior for cleanliness, dash instruments, clean windshield.

Inspect: Air induction system(s) and make sure connections are tight.

Report: Deficiencies to your supervisor.

Preventive Maintenance Schedule

Snow Blowers
Classes: 54's

LEVEL II SERVICE	Perform service every 500 usage hours or once a year before winter season.
RESPONSIBILITY	Department shop
ACTIONS	Complete all items under Level I Service.

Est. Hrs. 3.0	CHECK:	Tires for match, steering king pins, tie rods, alignment, power steering, pumps and hoses, springs, U-bolts and spring hangers, drive shafts and carrier bearings, all chain and gear accessory drives.
Est. Hrs. 6.0	REPLACE:	Service air cleaner(s) (replace if necessary), fuel, water, transmission, hydraulic filters, drain and refill transmisssion, transmission, transfer cases, differentials and gear boxes.
Est. Hrs. 4.0	PERFORM:	Gas - engine tune-up (including ignition parts, plugs and carburetor adjustment).
	Diesel:	Engine run rack at 1st PM II and every other PM II unless problems are experienced. Check throttle linkage and governor play, and turbocharger end play.
Est. Hrs. 8.0	PACK:	Pull wheels and pack bearings, replace seals, check brakes.

INSPECT: Universal joints and carrier bearings, body and engine(s) mounts, springs, radiator supports, clutch adjustment, drive chains and gears, hydraulic system lines, hoses and motors, all cutting ribbons and discharge chutes, hinge pins and wear shoes.

Est. Hrs. 4.0

REBUILD: Alternator(s) and starter(s) as necessary.

Est. Hrs. 3.0

OPERATIONS TEST: Test machine and attachments to ensure operational and that the unit is ready to return to service.

Est. Hrs. 0.5

REPORT: Deficiencies to Shop Superintendent.

Est. Hrs. 0.0

Total Est. Hours 28.5

EMS-0728

Preventive Maintenance Schedule

Snow Plows
Class: 50, 51, & 53

Responsibility		Action
Operator:	I.	In-service daily checks.
	Check:	Proper installation and wear of plow blades, proper alignment, hook-up pins, leaks in hydraulic lines, fittings and rams. Proper reversing and lifting, cracks and broken welds.
Operator:	II.	Preparation for storage (season end).
	Schedule:	Any required repairs with Shop Superintendent.
	Clean:	Paint or oil coat wear points and plow face to retard rusting. Label plow with unit number removed from.
Shop:	III.	Prepare for next season operation.
	Repair:	Crack and breaks.

EMS-0729

Preventive Maintenance Schedule

Sanders
Class: 57

Responsibility		Action
Operator:	I.	Perform in-service daily check.
	Check:	Proper installation and wear of chain and spinner, leaks in hydraulic lines and fittings.
	Lube:	All bearings.
Operator:	II.	Preparation for storage.
	Clean:	Wash all sander parts, apply oil or paint to inside of box, feeder, chain, sprockets and spinners.
	Lube:	All zerks.
	Change:	Engine and gear boxes oil (if so equipped), remove battery, store in a cool dry place, clean air cleaner.
	Schedule:	Needed repair work with Shop Superintendent.
	Place:	Sander on racks. If equipped with gasoline engine start and run each month.
Operator:	III.	Beginning of season.
	Fill:	Engine crank case, fuel tank.
	Install:	Fully-charged battery in sander and install sander in dump box.
	Start:	Engine.
	Check:	Operation of chain and sander.
	Check:	Hydraulic lines.

PREFORMANCE BUDGETING

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PERFORMANCE BUDGETING

A management system is incomplete without a budgeting component. The objective of performance budgeting is to develop a budget based on standard costs which are applied to an anticipated level of activity.

The budgets developed by the Performance Budget process are subject to change by the Director of Highways, Executive or Legislative action. Additionally, budget figures may increase or decrease as a result of inflation or deflation factors applied by the Office of Budget and Program Planning (OBPP) or the Legislative Fiscal Analysis (LFA). These changes are just a normal part of the budgeting process.

FLEET OPERATION FACTORS

Fleet Operation Factors are derived from a three year average of actual fleet activities. The following is a review of the eight Fleet Operations Factors showing an example of each:

TOTAL MILES DRIVEN

Total miles driven is an accumulation of all miles traveled by passenger cars through tandem axle trucks.

YEAR 1	YEAR 2	YEAR 3	AVERAGE
15,500,000	15,000,000	14,500,000	15,000,000

TOTAL MILES DRIVEN BY GASOLINE UNITS

The total miles driven by all passenger vehicles and medium duty gas trucks.

YEAR 1	YEAR 2	YEAR 3	AVERAGE
12,500,000	12,000,000	11,500,000	12,000,000

TOTAL MILES DRIVEN BY DIESEL UNITS

The total miles driven by all medium and heavy diesel trucks.

YEAR 1	YEAR 2	YEAR 3	AVERAGE
2,500,000	3,000,000	3,500,000	3,000,000

EQUIPMENT HOURS

Yearly equipment hours are taken from Class 30, Motor Patrols, and Class 32 Loaders as these two classes represent the majority of all hours.

YEAR 1	YEAR 2	YEAR 3	AVERAGE
125,000	150,000	175,000	150,000

TOTAL GALLONS OF GASOLINE

The projected gallons of gasoline required is computed by averaging three years of consumption and dividing by the average miles of travel accumulated during the same period. The resulting average miles per gallon is then applied to the projected miles of travel.

	YEAR 1	YEAR 2	YEAR 3	AVERAGE
GALLONS	1,750,000	1,600,000	1,450,000	1,500,000
MILES	12,500,000	12,000,000	11,500,000	12,000,000
Projected average miles per gallon:				7.5 mpg

Projected Miles Driven by gasoline units;	12,000,000 miles
divided by the average mile per gallon;	7.5 mpg
equals the estimated Gallons of Gasoline required:	1,600,000 gallons

TOTAL GALLONS OF DIESEL

The projected gallons of diesel required is computed by averaging three years of diesel consumption by mileage units and dividing the average miles for the same period. Also, the quantity of diesel required for hourly equipment is computed in the same manner; three years consumption is averaged and divided by the average hours of usage accumulated during the same period.

PROJECTED GALLONS FOR MILEAGE UNITS

	YEAR 1	YEAR 2	YEAR 3	AVERAGE
GALLONS	550,000	600,000	650,000	600,000
MILES	2,500,000	3,000,000	3,500,000	3,000,000
Average miles per gallon:				5.0 mpg

Projected miles Driven by Diesel units;	3,000,000 miles
divided by average gallons per mile;	5.0 mpg
equals the estimated gallons of diesel for mileage units:	600,000 gallons

PROJECTED GALLONS FOR HOURLY UNITS

	YEAR 1	YEAR 2	YEAR 3	AVERAGE
GALLONS	250,000	300,000	350,000	300,000
HOURS	125,000	150,000	175,000	150,000
Average gallons per hour:				2.0 gph

Projected Hourly Equipment total hours;	150,000 hours
times the average gallons per hour;	2.0 gph
equals the estimated gallons of diesel for hourly units:	300,000 gallons

PROJECTED MILEAGE GALLONS	600,000
PROJECTED HOURLY GALLONS	300,000
PROJECTED TOTAL GALLONS OF DIESEL	900,000

REPAIR HOURS

The yearly repair hours, for all shops, is obtained from the Shop Staffing Report (EMS-18). This report provides the total direct repair hours reported by each mechanic on their time slips.

YEAR 1	YEAR 2	YEAR 3	AVERAGE
81,000	80,000	79,000	80,000

TOTAL SALARIES

The performance budget process uses the current fiscal year (1100) salaries instead of a three year average. The "Total Salaries" are used with various budget standards when a relationship can not be established to miles driven or hours used.

TOTAL SALARIES	$3,000,000

It should be noted that the Fleet Operations Factors are reviewed by each budget area. A budget area may change a factor if they anticipate changes in personnel, such as workers compensation, or an increase in activities in the maintenance or construction programs. All changes have to be documented and approved by the Chief of the Equipment Bureau. An example of the form used to request a Fleet Operation Factor change can be found in section 0840.

BUDGET STANDARDS

With the exception of zero based items, budget standards are used to develop a third level performance budget. Budget standards are obtained by averaging three years of actual operating costs for major third level objects of expenditure. The remaining third level objects of expenditure are grouped together into a second level standard for each category. The standards are then applied to the "Fleet Operation Factors" to produce a budget based on an anticipated level of service.

BUDGET STANDARD DEVELOPMENT

OVERTIME AND DIFFERENTIAL PAY

Overtime and differential are grouped together under a standard which is expressed as a percent of 1100 salaries.

	YEAR 1	YEAR 2	YEAR 3
OVERTIME	$80,000	$85,000	$80,000
DIFFERENTIAL	5,000	5,000	5,000
1100 salaries	$2,800,000	$2,900,000	$3,000,000
Percent	.030	.030	.028

Budget standard for overtime and differential pay: .030 percent.

BENEFITS

1400 Payroll benefits are calculated as a percentage of total 1100 salaries. This figure is used for estimating purposes only. The Legislative process will determine the actual budgeted amount for benefits.

	YEAR 1	YEAR 2	YEAR 3
BENEFITS	$28,000	$29,000	$30,000
1100 salaries	$2,800,000	$2,900,000	$3,000,000
Percent	.100	.100	.100

Budget standard for personal services benefits: .100 percent.

2100 CONTRACTED SERVICES

All contracted services are zero based items and require individual justification. Budget standards are not developed for zero based items.

2104 INSURANCE costs are determined by the Department of Administration, Tort Claims Division.

Insurance	$150,000

2114 PAY ROLL SERVICE FEES are determined by the Department of Administration. Final figures will be determined during the Legislative budget process.

Payroll service fees	$ 6,000

OTHER 2100 All other 2100 expenditures are justified and totaled.

All other 2100's	$ 65,000

2200 SUPPLIES AND MATERIALS

GASOLINE 2216 The cost per gallon of gasoline is estimated based on current prices and anticipated market fluctuations.

Projected gasoline cost per gallon	$1.00

DIESEL 2242 The cost per gallon of diesel is estimated based on current prices and anticipated market fluctuations.

Projected diesel cost per gallon	$0.70

SHOP SUPPLIES 2229 Expenditures for shop supplies such as nuts, bolts, rags, and miscellaneous small parts are averaged and divided by the average miles driven for the same period to produce a budget standard based on a cost per mile.

	YEAR 1	YEAR 2	YEAR 3
SHOP SUPPLIES	$210,000	$225,000	$240,000
MILES	15,000,000	15,000,000	15,000,000
Per Mile	.014	.015	.016
Budget standard for shop supplies:			$0.015 per mile

PROPANE 2297 The propane budget standard is a three year average of actual expenditures divided by the average equipment hours for the same period.

	YEAR 1	YEAR 2	YEAR 3
PROPANE	$21,000	$22,500	$22,750
HOURS	125,000	150,000	175,000
Per Hour	.170	.150	.130
Budget standard for propane:			$0.150 per hour

ALL OTHER 2200's

All other 2200 objects of expenditure are totaled, averaged and divided by the average miles driven for the same period.

	YEAR 1	YEAR 2	YEAR 3
ALL OTHER	$75,000	$75,000	$75,000
MILES	15,000,000	15,000,000	15,000,000
Per Mile	.005	.005	.005

Budget standard for all other 2200 expenses: $0.005 per mile

2300 COMMUNICATIONS

The communication budget standard is a three year average of expenditures divided by the average miles driven for the same period.

	YEAR 1	YEAR 2	YEAR 3
COMMUNICATIONS	$105,000	$90,000	$75,000
MILES	15,000,000	15,000,000	15,000,000
Per Mile	.007	.006	.005

Budget standard for communications: $0.006 per mile

2400 TRAVEL

The travel budget standard is a three average of expenditures divided by the average miles driven for the same period.

	YEAR 1	YEAR 2	YEAR 3
TRAVEL	$15,000	$15,000	$15,000
MILES	15,000,000	15,000,000	15,000,000
Per Mile	.001	.001	.001
Budget standard for travel:			$0.001

2500 RENT

The rent budget standard is expressed as a percent of 1100 salaries.

	YEAR 1	YEAR 2	YEAR 3
RENT	$3,000	$2,900	$2,700
SALARIES	$2,800,000	$2,900,000	$3,000,000
Percent	.0011	.0010	.0009
Budget standard for rent:			$0.0010 percent

2600 UTILITIES

The annual utility costs are expressed as a percent of 1100 salaries.

	YEAR 1	YEAR 2	YEAR 3
UTILITIES	$25,000	$29,000	$33,000
Salaries	$2,800,000	$2,900,000	$3,000,000
Percent	.0090	.0100	.1100
Budget standard for utilities:			$0.0010 percent

2700 REPAIRS AND MAINTENANCE

TIRES AND TUBES 2727	The cost of tires and tubes are averaged and divided by the average miles driven for the same period.

	YEAR 1	YEAR 2	YEAR 3
TIRES/TUBES	$175,000	$150,000	$126,000
MILES	15,000,000	150,000,000	15,000,000
Per Mile	.0115	.0100	.0085
Budget standard for tires and tubes:			$0.0100 per mile

CUTTING
EDGES
2728

Cutting edge costs are averaged and divided by the average miles of travel for the same period.

	YEAR 1	YEAR 2	YEAR 3
CUTTING EDGES	$375,000	$300,000	$225,000
MILES	15,000,000	15,000,000	15,000,000
Per Mile	.0250	.0200	.0150

Budget standard for cutting edges: .0200 per mile

REPAIR
PARTS
2757

Three years of expenditures for repair parts are averaged and divided by the average hours of repair for the same period.

	YEAR 1	YEAR 2	YEAR 3
REPAIRS	$830,000	$800,000	$770,000
REPAIR HOURS	81,000	80,000	79,000
Per hour	10.25	10.00	9.75

Budget standard for repairs:

ALL
OTHER

All other 2700 expenditures are totaled together, averaged and divided by the average miles driven for the same period.

	YEAR 1	YEAR 2	YEAR 3
OTHER 2700's	$67,500	$60,000	$52,000
MILES	15,000,000	15,000,000	15,000,000
Per Mile	.0045	.0040	.0035

Budget standard for other repairs: $0.0040 per mile

2800 OTHER EXPENSES

All "Other Expenses" are totaled, averaged and expressed as percentage of 1100 salaries for the same period.

	YEAR 1	YEAR 2	YEAR 3
OTHER EXPENSES	$2,800	$2,900	$3,000
SALARIES	$2,800,000	$2,900,000	$3,000,000
Percent	.0010	.0010	.0010
Budget standard for other expenses:			.0010 percent

3000 CAPITAL EQUIPMENT

All capital equipment is zero based and is justified by the Equipment Bureau as part of the total equipment program budget.

It should be noted that the Budget Standards are reviewed by each budget area. A budget area may request a standard change if their actual expenditures over a three year period differ significantly from statewide averages.

Any change has to be documented and approved by the Chief of the Equipment Bureau. An example of the form used to request a Budget Standard change can be found in section 840.

BUDGET DEVELOPMENT

The following is an example of how the eight "Fleet Operation Factors" and "Budgets Standards" are used to develop a budget based on anticipated activity levels.

BUDGET OBJECT OF EXPENDITURE	PERFORMANCE BUDGET
1000 PERSONNEL SERVICES	
OVERTIME AND DIFFERENTIAL	$90,000
Total Salaries ($3,000,000) times the overtime and differential performance standard (.0300%).	
PERSONAL BENEFITS	$300,000
Total Salaries ($3,000,000) times the personal benefits performance standard (.1000%).	
2000 OPERATING EXPENSES	
2104 INSURANCE (Actual figure provided)	$ 150,000
2114 PAYROLL SERVICE FEES (Actual figure provided)	$ 6,000
ALL OTHER 2100's	$ 65,000
2100 TOTAL CONTRACTED SERVICES	$ 221,000
2216 GASOLINE	$1,600,000
The total gallons of gasoline (1,600,000) times the estimated price of $1,00 per gallon.	
2242 DIESEL	$ 630,000
The total gallons of diesel (900,000) times the estimated price of 0.70 per gallon.	

2297 PROPANE	$ 22,500
Total equipment hours (150,000) times the performance standard of $0.150 per hour.	
ALL OTHER 2200's	$ 75,000
Total miles of travel (15,000,000) times the standard of $0.005 per mile.	
2200 TOTAL SUPPLIES AND MATERIALS	$2,327,500
2300 COMMUNICATIONS	$ 90,000
Total miles driven (150,000,000) times the performance standard of $0.006.	
2400 TRAVEL	$ 15,000
Total miles driven (15,000,000) times the performance standard of $0.001.	
2500 RENT	$ 3,000
Total salaries ($3,000,000) time the performance standard of .0010 percent.	
2600 UTILITIES	$ 33,000
Total salaries ($3,000,000) times the performance standard of .1100 percent.	
REPAIRS AND MAINTENANCE	
2727 TIRES AND TUBES	$ 150,000
Total miles of travel (15,000,000) time the standard of $0.0100 per mile.	
2728 CUTTING EDGES	$ 300,000
Total miles of travel (15,000,000) times the standard of $.0200 per mile.	
2757 REPAIRS	$ 800,000
Total shop hours (80,000) times the standard of $10.00 per repair hour.	

	ALL OTHER 2700's	$ 60,000
	Total miles of travel (15,000,000) times the "All Other" 2700 expenditures standard of $.0035 per mile.	
2700	TOTAL REPAIRS AND MAINTENANCE:	$1,310,000
2800	OTHER EXPENSES	$ 60,000
	Total miles driven (15,000,000) times the performance standard for "all other" expenses of $0.0040.	
3000	CAPITAL EQUIPMENT	$5,000,000
	All capital equipment is zero based and an actual figure must be entered into the performance budget.	

DEPARTMENT OF HIGHWAYS
ZERO BASED REQUEST FOR FISCAL ___
DATE ___/___/___

Responsibility Center: ____________ Number ____________ Name

Object of Expenditure: ____________ Number ____________ Name

Amount of Zero Base Requested $____________

Actual FY ____ Expenditures were $____________
Estimated FY ___ Expenditures $____________
(+) Increase (-) Decrease $____________

Justification:

____________ Area Manager ____________ Date

____ Approve ____ Disapproved*
Comments:

____________ District Engineer ____________ Date

____ Approve ____ Disapproved*
Comments:

____________ Chief Equipment Bureau ____________ Date

*Comments Required
Modified B-Z For Performance Budgeting

FLEET OPERATIONS FACTORS
WORKSHEET

Factor Name: ____

Current Factor ______________

Proposed Factor ______________

Justification:

______________________ ______________

Area Manager Date

____ Approve ____ Disapproved*

Comments:

______________________ ______________

District Engineer Date

____ Approve ____ Disapproved*

Comments:

______________________ ______________

Chief Equipment Bureau Date

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*Disapproval Requires Comments:
When changes are approved a new proposed budget will be issued showing the change.

EMS-0840

PERFORMANCE BUDGETING

PERFORMANCE STANDARD CHANGES

WORKSHEET

Performance Standard

Any requested change in a performance standard must be fully documented and justified.

Performance budget objects of expenditures, three year history:

Expenditure ________ Definition ________________________________

	Actual Expenditures	Divided By	Fleet Operation Factor (Miles/Hrs/Dollars) or % Salaries	Cost Per Mile/Hour
FY____	$__________	÷	______________	.____
FY____	$__________	÷	______________	.____
FY____	$__________	÷	______________	.____

Three Year Average ____

Requested Standard Change: ________

Comment:

________________ Area Manager ________________ Date

____ Approve ____ Disapproved*
Comments:

________________ District Engineer ________________ Date

____ Approve ____ Disapproved*
Comments:

________________ Chief Equipment Bureau ________________ Date

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*Disapproval Requires Comments:
Change approval with result in an updated performance budget.

EMS FLEET SIZING

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FLEET SIZING

Establishing the correct fleet size and composition is a critical component of any Equipment Management System. Setting actual numbers of vehicles and equipment impacts work methods, work efficiency, replacement requirements, repair needs, mechanic training, size of facilities and assignment of units.

The overall fleet size was developed in three categories. Maintenance, Construction and all other (GVW, Core Drill and Program Development). Each category was established as follows:

- Maintenance -- considered such factors as facilities, stockpile locations and available personnel to obtain minimum fleet levels for present operations to ensure satisfactory response to winter emergencies on each route in each section.
- Construction -- is determined from the vehicle standards in the Construction Management System.
- All others -- are determined by documented program needs on a vehicle by vehicle basis.

Although each category was established by looking at requirements for each section, project or specific program function, actual assignment is delegated to supervisors to ensure maximum fleet utilization.

EMS FLEET SIZE ANALYSIS

WINTER MAINTENANCE FLEET SIZE REQUIREMENTS

STATEWIDE

	Authorized Fleet Level by Class						
Maintenance Area	07,08	09	19	27	29	30	32
Missoula	11	18	33	9	16	13	33
Kalispell	7	17	47	3	9	14	29
Butte	23	19	57	6	23	13	38
Bozeman	5	10	28	6	12	8	13
Great Falls	9	14	37	8	15	11	19
Havre	9	11	27	8	6	9	14
Glendive	8	8	22	2	8	6	12
Wolf Point	8	8	24	2	6	6	11
Miles City	5	14	32	3	11	11	19
Billings	15	14	35	3	19	10	22
Lewistown	7	11	27	3	10	9	14
Statewide Total	107	144	369	*53	135	110	224
Actual Assigned	198	79	408	48	66	110	217
Short (-)/Long (+)	+91	-65	+39	-5	-69	0	-7

* Includes 21 Four-Wheel Drive

EMS FLEET SIZE ANALYSIS

WINTER MAINTENANCE FLEET SIZE REQUIREMENTS

KALISPELL

Section		Authorized Fleet Level by Class						
No.	Desc.	07,08	09	19	27	29	30	32
1201	Kalispell	1	1	6	0	2	1	2
1202	Columbia Falls	0	1	2	1	1	1	3
1203	West Glacier	0	1	3	0	0	1	2
1204	East Glacier	0	1	0	2	2	1	3
1205	Bigfork	0	1	2	0	1	1	1
1206	Swan Lake	0	1	2	0	0	1	3
1207	Polson	0	1	3	0	0	1	1
1209	Elmo	0	1	2	0	0	0	1
1210	Hot Springs	0	1	2	0	0	1	1
1211	Thompson Falls	0	1	3	0	0	1	1
1212	Marion	0	1	2	0	0	0	1
1213	Crystal Creek	0	1	2	0	0	1	1
1214	Noxon	0	1	3	0	0	1	1
1215	Olney	0	1	2	0	0	1	2
1216	Eureka	0	1	4	0	0	1	1
1219	Libby	0	1	4	0	1	1	2
1220	Troy	0	1	3	0	0	0	1
Section Total		1	17	45	3	7	14	27
Areawide Total		6	0	2	0	2	0	2
Kalispell Total		7	17	47	3	9	14	29
Actual Assigned		12	14	46	6	6	14	33
Short(-)/Long(+)		+5	-3	-1	+3	-3	0	+4

EMS FLEET SIZE ANALYSIS

WINTER MAINTENANCE FLEET SIZE REQUIREMENTS

MISSOULA

Section		Authorized Fleet Level by Class						
No.	Desc.	07,08	09	19	27	29	30	32
1101	Msla-Blackfoot	3	1	5	0	2	1	4
1102	Clearwater	0	1	3	0	0	0	2
1103	Rainy Lake	0	1	0	3	0	1	1
1104	Clinton	0	1	3	0	0	0	2
1105	Drummond	0	1	2	0	2	1	1
1106	Philipsburg	0	1	2	1	0	0	1
1107	Lolo Pass	0	1	1	2	0	1	1
1109	Hamilton	0	1	3	0	0	1	2
1110	Lost Trail	0	1	1	2	0	1	3
1111	Evaro	1	1	2	0	2	1	3
1112	Alberton	0	1	2	0	1	1	2
1113	Superior	0	1	2	0	1	1	2
1114	Saltese	1	1	0	0	5	1	3
1116	Ronan	0	1	3	0	1	1	2
1117	Plains	0	1	3	0	0	1	2
Section Total		5	15	32	8	14	12	31
Areawide Total		6	3	1	1	2	1	2
Missoula Total		11	18	33	9	16	13	33
Actual Assigned		21	12	42	7	6	13	32
Short(-)/Long(+)		+10	-6	+9	-2	-10	0	-1

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EMS FLEET SIZE ANALYSIS

WINTER MAINTENANCE FLEET SIZE REQUIREMENTS

BUTTE

Section No.	Desc.	Authorized Fleet Level by Class 07,08	09	19	27	29	30	32
2101	Butte A & B	2	2	6	0	5	1	2
2103	Boulder	1	1	4	0	3	1	2
2104	Helena	1	1	5	0	2	1	3
2105	Townsend	0	1	3	0	0	0	3
2106	Whitehall	0	1	3	0	1	1	3
2107	Bernice	0	1	0	0	3	0	1
2109	Twin Bridges	0	1	4	0	0	1	3
2110	Dillon	1	1	5	0	0	1	3
2111	Lima	0	1	1	0	2	1	1
2112	Divide	0	1	2	0	1	0	2
2113	Wisdom	0	1	2	*1	0	1	2
2114	Anaconda	0	1	4	1	0	1	2
2115	Deer Lodge	1	1	5	0	0	1	2
2116	McDonald Pass	1	1	4	1	2	1	3
2118	White Sulphur Springs	0	1	3	*1	1	1	2
2119	Deep Creek	0	1	0	2	0	1	2
Section Total		7	17	51	6	20	13	36
Areawide Total		16	2	6	0	3	0	2
Butte Total		23	19	57	6	23	13	38
Actual Assigned		43	9	75	8	7	13	32
Short (-)/Long (+)		+20	-10	+18	+2	-16	0	-6

*One four-wheel drive

EMS FLEET SIZE ANALYSIS

WINTER MAINTENANCE FLEET SIZE REQUIREMENTS

BOZEMAN

Section		Authorized Fleet Level by Class						
No.	Desc.	07,08	09	19	27	29	30	32
2201	Bozeman A	2	1	3	0	3	1	2
2202	Livingston	0	1	3	0	2	1	2
2204	Wilsall	0	1	3	0	0	1	1
2205	Carbella	0	1	1	0	0	0	1
2206	Big Sky	0	1	4	*1	0	1	1
2207	Duck Creek	0	1	2	*3	0	1	1
2208	Ennis	0	1	2	*1	1	1	1
2209	Harrison	0	1	1	0	1	0	1
2210	Bozeman B	0	1	4	*1	1	1	1
2211	Three Forks	0	1	2	0	2	1	1
Section Total		2	10	25	6	10	8	12
Areawide Total		3	0	3	0	2	0	1
Bozeman Total		5	10	28	6	12	8	13
Actual Assigned		15	4	32	8	6	8	13
Short (-)/Long (+)		+10	-6	+4	+2	-6	0	0

*One four-wheel drive

EMS FLEET SIZE ANALYSIS

WINTER MAINTENANCE FLEET SIZE REQUIREMENTS

GREAT FALLS

Section		Authorized Fleet Level by Class						
No.	Desc.	07,08	09	19	27	29	30	32
3101	Great Falls A	1	1	6	*1	0	1	1
3102	Fort Benton	0	1	4	0	0	1	1
3103	Belt	0	1	2	*1	1	1	1
3104	Neihart	0	1	0	*3	0	0	1
3105	Cascade	0	1	2	0	2	1	1
3106	Wolf Creek	0	1	2	0	2	1	1
3107	Rogers Pass	0	1	0	*2	2	1	2
3108	Lincoln	0	1	3	0	0	1	2
3109	Sun River	0	1	2	0	2	1	1
3110	Augusta	0	1	3	0	0	1	1
3111	Great Falls B	1	1	4	0	2	1	1
3112	Choteau	0	1	3	*1	0	1	1
3113	Dutton	0	1	2	0	2	0	1
Section Total		2	13	33	8	13	11	15
Areawide Total		7	1	4	0	2	0	4
Great Falls Total		9	14	37	8	15	11	19
Actual Assigned		15	11	41	4	6	11	19
Short(-)/Long(+)		+6	-3	+4	-4	-9	0	0

*One four-wheel drive

EMS FLEET SIZE ANALYSIS

WINTER MAINTENANCE FLEET SIZE REQUIREMENTS

HAVRE

Section		Authorized Fleet Level by Class						
No.	Desc.	07,08	09	19	27	29	30	32
3201	Havre	1	1	4	*1	2	1	1
3202	Harlem	0	1	3	0	0	1	1
3203	Big Sandy	0	1	3	0	0	1	1
3204	Chester	0	1	2	0	0	0	1
3205	Shelby	1	1	2	0	3	1	2
3206	Dupuyer	0	1	2	*1	0	1	1
3208	Cut Bank	0	1	3	0	0	1	1
3209	Browning	0	1	2	*3	0	1	1
3210	St. Mary's	0	1	0	*3	0	1	1
3211	Conrad	0	1	3	0	0	1	1
Section Total		2	10	24	8	5	9	11
Areawide Total		7	1	3	0	1	0	3
Havre Total		9	11	27	8	6	9	14
Actual Assigned		19	6	23	6	5	9	14
Short(-)/Long(+)		+10	-5	-4	-2	-1	0	0

*One four-wheel drive

EMS FLEET SIZE ANALYSIS

WINTER MAINTENANCE FLEET SIZE REQUIREMENTS

GLENDIVE

Section		Authorized Fleet Level by Class						
No.	Desc.	07,08	09	19	27	29	30	32
4101	Glendive	1	1	5	*1	4	1	2
4102	Sidney	0	1	4	0	0	1	1
4103	Wibaux	0	1	1	0	1	0	1
4105	Terry	0	1	3	0	0	1	1
4106	Circle	0	1	2	0	1	1	2
4107	Flowing Wells	0	1	3	0	0	1	1
4109	Jordan	0	1	2	*1	0	1	1
Section Total		1	7	20	2	6	6	9
Areawide Total		7	1	2	0	2	0	3
Glendive Total		8	8	22	2	8	6	12
Actual Assigned		17	2	23	0	6	6	11
Short (-)/Long (+)		+4	-8	+1	-2	-2	0	0
*One-four wheel drive		+5	-6					

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EMS FLEET SIZE ANALYSIS

WINTER MAINTENANCE FLEET SIZE REQUIREMENTS

WOLF POINT

Section		Authorized Fleet Level by Class						
No.	Desc.	07,08	09	19	27	29	30	32
4201	Wolf Point	1	1	5	0	2	1	2
4202	Culbertson	0	1	3	0	1	1	1
4203	Plentywood	0	1	3	*1	0	1	1
4205	Glasgow	0	1	3	0	1	1	1
4207	Malta	0	1	3	*1	0	1	2
4208	Opheim	0	1	2	0	0	0	1
4209	Scobey	0	1	3	0	0	1	1
Section Total		1	7	22	2	4	6	9
Areawide Total		7	1	2	0	2	0	2
Wolf Point Total		8	8	24	2	6	6	11
Actual Assigned		7	6	22	0	6	6	11
Short (-)/Long (+)		+1	-2	-2	-2	0	0	0

*One four wheel drive

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EMS FLEET SIZE ANALYSIS

WINTER MAINTENANCE FLEET SIZE REQUIREMENTS

MILES CITY

Section		Authorized Fleet Level by Class						
No.	Desc.	07,08	09	19	27	29	30	32
4301	Miles City A	0	1	4	0	0	1	1
4302	Fiddleback	0	1	2	0	0	1	1
4303	Beaverslide	0	1	1	0	0	1	1
4304	Broadus	0	1	2	*1	1	1	1
4305	Boyes	0	1	2	0	0	1	1
4306	Forsyth	0	1	2	0	2	1	1
4307	Ashland	0	1	2	0	2	1	2
4308	Ingomar	0	1	2	0	0	1	1
4309	Hillside	0	1	2	0	0	1	1
4310	Colstrip	0	1	2	0	0	0	1
4312	Miles City B	0	1	3	0	1	0	1
4313	Miles City C	0	1	3	0	1	1	1
4314	Baker	0	1	2	0	2	1	2
Section Total		0	13	29	1	9	11	15
Areawide Total		5	1	3	*2	2	0	4
Miles City Total		5	14	32	3	11	11	19
Actual Assigned		13	4	32	3	6	11	18
Short (-)/Long (+)		+8	-10	0	0	-5	0	-1

*One-four wheel drive (one in Broadus and one areawide)

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EMS FLEET SIZE ANALYSIS

WINTER MAINTENANCE FLEET SIZE REQUIREMENTS

BILLINGS

Section		Authorized Fleet Level by Class						
No.	Desc.	07,08	09	19	27	29	30	32
5101	Lodge Grass	0	1	3	0	2	1	2
5102	Billings B	1	1	4	0	2	1	2
5103	Billings C	1	1	5	0	2	1	2
5104	Custer	0	1	1	0	2	1	2
5105	Hysham	0	1	2	0	1	0	2
5106	Hardin	0	1	2	0	2	1	1
5107	Busby	0	1	2	1	0	1	2
5109	Laurel	0	1	2	0	1	0	1
5110	Bridger	0	1	2	0	1	1	1
5111	Red Lodge	1	1	2	2	0	1	1
5112	Columbus	0	1	2	0	2	1	1
5113	Big Timber	1	1	3	0	2	1	1
Section Total		4	12	30	3	17	10	18
Areawide Total		11	2	5	0	2	0	4
Billings Total		15	14	35	3	19	10	22
Actual Assigned		20	6	44	5	6	10	20
Short (-)/Long (+)		+5	-8	+9	+2	-13	0	-2

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EMS FLEET SIZE ANALYSIS

WINTER MAINTENANCE FLEET SIZE REQUIREMENTS

LEWISTOWN

Rev. 2/90

Section No.	Desc.	07,08	09	19	27	29	30	32
		Authorized Fleet Level by Class						
5301	Lewistown	1	1	6	*1	2	1	2
5302	Roy	0	1	2	0	0	1	1
5303	Mobridge	0	1	1	0	1	1	1
5304	Grassrange	0	1	2	0	0	1	1
5305	Winnett	0	1	2	0	1	1	1
5307	Roundup	0	1	3	0	2	1	1
5308	Ryegate	0	1	2	0	0	0	1
5309	Harlowton	0	1	3	*1	1	1	1
5312	Stanford	0	1	2	*1	1	1	1
5313	Denton	0	1	2	0	0	1	1
Section Total		1	10	25	3	8	9	11
Areawide Total		6	1	2	0	2	0	3
Lewistown Total		7	11	27	3	10	9	14
Actual Assigned		16	5	28	1	6	9	14
Short (-)/Long (+)		+9	-6	+1	-2	-4	0	0

* Are Four-Wheel Drive

EMS 1000
REPLACEMENT MODEL
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I. THE MODEL

The Montana Department of Highways (MDH) must replace old, worn out, and obsolete equipment to properly maintain an inventory of equipment. To accomplish this, the MDH must properly analyze fleet performance and costs to decide which units must be replaced. Equipment replacement analysis consists of evaluating two alternatives:

1) to retain an existing unit, or
2) to replace the existing unit with a new unit.

The objective of replacement analysis is to select the least-cost alternative that will satisfy the MDH's equipment requirements.

The decision to retain an existing unit or to purchase a new unit is usually done on an annual basis. Thus, one needs to determine the expected annual costs of the existing unit and the expected annual costs of a new unit. The expected annual costs of a new unit depend upon several factors including purchase price, depreciation, and the expected life of the unit. In general, the total costs (TCn) of owning equipment for n years is equal to the total loss in value (TLVn) for the n years plus the total costs of operating the equipment (TOCn) over a specified number of years (n). This may be written as:

$$TCn = TLVn + TOCn$$

Another cost that must be accounted for is the loss of opportunity costs should the investment in equipment and operating costs be invested in a revenue-producing situation. Two mathematical equations which help account for the time value of money are:

1) Single Present Worth (SPW)

$$SPWi,n = 1/(1 + i)^n$$

This factor is used to determine the present worth of a future amount discounted at interest rate i for n periods (usually years). Thus, the present value (PV) of a future amount (FA) to be discounted at interest rate i for n years is:

$$PV = FA(SPWi,n)$$
$$= FA/(1 + i)^n$$

As an example, if a dump truck would have a value of $10,000 in 5 years, then the present value (the value today) of the $10,000 truck would be:

$$PV = \$10,000/(1 + i)^5$$

As indicated, we must have some idea as to what the interest rate (i) would be during the 5-year period. In our example, if i equals .12, then PV = $5,674. If i equals .08, then the present value of the truck would be $6,806.

2) Uniform Capital Recover (UCR)

$$UCRi,n = i(1 + i)^n/((1 + i)^n - 1)$$

The UCR factor is used when we want to determine equivalent periodic payments to reduce a potential investment to zero over n periods. The interest rate in this equation helps us account for opportunity costs. Thus, if I represents the amount of the investment, then the equivalent annual cost (ACn) for n years at i interest rate is:

$$ACn = I(UCRi,n)$$

This factor is used in our analysis to determine the equivalent annual costs of the potential investment in equipment and operating costs.

As an example, suppose we had determined that the total cost of owning a dump truck for 5 years was $10,000 in present value dollars. Then the equivalent annual costs of owning the truck would be:

$$AC5 - \$10,000(UCRi,5)$$

Again, we need to have some idea about the future interest rates in order to solve the equation. If we assume i equals .12, then AC5 = $2,774. If i equals .08 then the equivalent annual cost would be $2,505.

A. Equivalent Annual Costs of New Equipment

As stated previously, the present value of total costs of owning equipment for n years (TCn) is defined as the total loss in value costs (TLVn) plus the total costs of operation for all of the n years (TOCn) including maintenance and downtime. This is written as:

$$TCn = TLVn + TOCn$$

1. Total Loss in Value Costs

The TLVn costs are defined as the new cost of the equipment (P) less the present worth of any future salvage value in n years. In order to determine the future salvage value of equipment, one must assume an annual depreciation factor and multiply this factor times the new cost for each of the n years. If C were our depreciation factor, then the future salvage value after n years of the equipment would be written as:

$$Ln = P(C^n)$$

Suppose a dump truck costs $50,000 new and depreciates 25 percent per year for 5 years. Our depreciation factor would be .75 and the expected salvage value of the equipment in 5 years would be:

$$\begin{aligned} L5 &= 50{,}000(.75)^5 \\ &= \$11{,}865 \end{aligned}$$

To determine the salvage value in present value dollars, one must apply the single present worth (SPWi,n) equation to this amount. Thus, the total loss in value (TLVn) of our equipment for n years would be written as:

$$TLVn = P - Ln(SPWi,n)$$

And, in the above example:

$$\begin{aligned} TLV5 &= P - L5/(1 + i)^5 \\ &= 50{,}000 - 11{,}866/(1+i)^5 \end{aligned}$$

and if $i = .12$, then:

$$\begin{aligned} TLV5 &= 50{,}000 - 6{,}733 \\ &= \$43{,}267 \end{aligned}$$

Therefore, the total present value cost of owning a $50,000 dump truck, which depreciates 25 percent per year for 5 years, would be $43,267 assuming a 12 percent interest rate to discount the future salvage value of the truck. This, of course, does not include the total costs of operating the truck.

2. Total Operating Costs

The total present value costs of operating a unit for n years (TOCn) is the sum of the costs for each of the years (Xj) discounted at an interest rate for each of the n years. This is written as:

$$TOC_n = \sum_{J-1}^{n} \frac{X_j}{(1 + i)^j}$$

As an example, for n = 3:

$$TOC3 = \frac{X1}{(1 + i)} + \frac{X2}{(1 \times i)^2} + \frac{X3}{(1 + i)^3}$$

Suppose, in our example, the costs of operating our dump truck were:

Year	Cost of Operating
1	$6,850
2	7,200
3	7,740
4	8,620
5	10,680

Then, the total present value costs of operating the truck for 5 years (assuming that the value of money is discounted at 12 percent per year) would be:

$$TOC5 = \frac{6,850}{(1 + .12)} + \frac{7,200}{(1 + .12)^2} + \frac{7,740}{(1 + .12)^3} + \frac{8,620}{(1 + .12)^4} + \frac{10,680}{(1 + .12)^5}$$

$$= 6,116 + 5,740 + 5,509 + 5,478 + 6,060$$

$$= \$28,903$$

3. Equivalent Annual Costs

At this point in our example, we have determined the total present value costs (total loss in value plus total operating costs) to own a $50,000 dump truck for 5 years. That is,

$$\begin{aligned} TC5 &= TLVn + TOC5 \\ &= 43,267 + 28,903 \\ &= \$72,170 \end{aligned}$$

To determine the equivalent annual cost of owning the dump truck, one must apply the uniform capital recovery equation (UCRi,j) to this potential investment. Then, the equivalent annual cost of owning the dump truck for 5 years would be:

$$\begin{aligned} AC5 &= TC5(UCR12,5) \\ &= (\$72,170)\frac{(.12)(1 + .12)^5}{(1 + .12)^5 - 1} \\ &= \$20,021 \end{aligned}$$

Table 1 lists the equivalent annual costs of our example for 8 time periods. As illustrated in the last column, the equivalent annual costs bottoms out in the sixth year and then begins to climb again. This phenomenon occurs because operating costs increase significantly as time increases while capital costs decrease.

TABLE 1

HIGHWAY DEPARTMENT EQUIPMENT REPLACEMENT COST ANALYSIS
EQUIVALENT ANNUAL COST ESTIMATION

Purchase Price (P)	$50,000	Number of Years (n)	8
Interest Rate (i)	.12	Depreciation Factor (C)	.75

Year n	Salvage[1] Value Ln	Present[2] Value Equation SPWi,n	Present Value Salvage $L/(1+i)^n$	Total[3] Loss in Value TLVn	Operating Costs Xn	Present Value Operating Costs Xn/(1+i)n	Present[4] Value Total Costs TCn	Equivalent[5] Annual Cost ACn
1	$37,500	1.12000	$33,482	$16,518	$ 6,850	$6,116	$ 22,634	$25,350
2	$28,125	1.25440	$22,421	$27,579	$ 7,200	$5,740	$ 39,435	$23,334
3	$21,094	1.40493	$15,014	$34,986	$ 7,740	$5,509	$ 52,351	$21,796
4	$15,821	1.57352	$10,055	$39,945	$ 8,620	$5,478	$ 62,788	$20,672
5	$11,866	1.76234	$ 6,733	$43,267	$10,680	$6,060	$ 72,170	$20,021
6	$ 8,900	1.97382	$ 4,509	$54,491	$13,530	$6,855	$ 81,249	$19,762
7	$ 6,675	2.21068	$ 3,019	$46,981	$17,640	$7,979	$ 90,718	$19,878
8	$ 5,006	2.47596	$ 2,022	$47,978	$22,066	$8,912	$100,627	$20,257

[1] Salvage value (L) is defined as $P(C^n)$ where P = purchase price, C = depreciation factor, and n = number of years.

[2] The present value equation SPWi,n is calculated from the interest rate and number of years. It is defined as $SPWi,n = 1/(1 + i)^n$.

[3] Total loss in value (TLVn) for n years is defined as TLVn = P - Ln(SPWi,n), where P = purchase price, Ln is the salvage value, and SPWi,n is the present value equation defined in footnote 2 above.

[4] The present value of total costs (TCn) for n years is defined as the total loss in value (TLVn) plus the sum of the present value of operating costs for each of the n years.

[5] Equivalent annual costs (ACn) for n years is the equal capital recovery payments of the present value of the total costs. It is defined as ACn = TCn(UCRi,n), where TCn is the total present value cost of owning the equipment and UCRi,n is the uniform capital recovery equation.

In summary, the equivalent annual costs of owning a unit of equipment for n years can be estimated using the following equation:

$$ACn = [P - Ln(SPWi,n) + \sum_{J-1}^{n} Xj\ (SPWi,j)](UCRi,n)$$

$$= [P - Ln/(1 + i)^{n} + \sum_{J-1}^{n} Xj/(1 + i)^{j}](i(1 + i)^{n}/(1 + i)^{n} - 1)$$

Where:

ACn = Equivalent annual costs for n years

P = New purchase price

Ln = Salvage value at the end of Year n

SPWi,n = Single present worth formula with interest rate i for n years

Xj = Operating costs in Year j

i = Expected interest rate

UCRi,j = Uniform capitol recovery formula with interest rate i for n years

B. Equivalent Annual Cost of Owning an Existing Unit

For an existing unit, the total costs of owning (TCn) the equipment can be determined in the same manner as for a new unit. In our case, we are interested in the costs of keeping an existing unit for 1 more year. In this manner, we can compare this cost with the equivalent annual cost of buying a new unit and keeping it for n years.

1. Total Loss in Value

The total loss in value of an existing unit for 1 year is equal to the value at the beginning of the year less the discounted salvage

value of the unit at the end of the year. To determine the total loss in value, we use the current new price of the unit and depreciate this cost by the age of the unit. We use current new price of the unit to account for the impact of new prices on the existing values of equipment. This is written as:

$$Ln = P(C^n)$$

where

Ln = Salvage value at end of year n

P = New price

C = Depreciation factor

n = Number of years

for

$C = .75$

$P = \$50,000$

$n = 7$

then

$$L7 = \$50,000(.75)^7$$
$$= \$6,675$$

At the end of the next year ($n=8$), the salvage value would be:

$$L8 = \$50,000(.75)^8$$
$$= \$5,006$$

Discounting this value for 1 year, the total loss in value of keeping the unit for 1 more year would be:

$$TLVn = Ln - Ln+1(SPWi,1)$$

In our example,

$$TLVn = 50{,}000(.75)^7 - 50{,}000(.75)^8/(1 + i)$$

$$= \$6{,}675 - \$5{,}006/1.12$$

$$= \$2{,}205$$

2. Total Operating Costs

The total operating costs will be assumed to be paid at the end of Year n so that they must be discounted in order to calculate total present value costs.

Thus, the total operating costs (TOCn) in present value for Year j would be:

$$TOCj = Xj/(1 + i)$$

where:

TOCj = Total present value of operating costs for Year j
Xj = Actual operating costs in the Year j
i = Expected interest rate

In our example, suppose the estimated operating costs were $18,500 for the next year so that the total present value of operating costs would be:

$$TOC8 = \$18{,}500/(1 + i)$$

and if $i = .12$, then:

$$TOC8 = \$16{,}518$$

Thus, the total present value cost of owning the equipment for 1 more year (Year j) would be:

$$TCj = TLVn + TOCj$$

In our example,

$$\begin{aligned} TC8 &= \$2,205 + \$16,518 \\ &= \$18,723 \end{aligned}$$

3. Equivalent Annual Cost

To determine the equivalent annual costs and to account for opportunity costs, we apply the uniform cost recovery factor to the present value of total costs for 1 year. Then the equivalent annual cost would be:

$$\begin{aligned} ACj &= TCj(UCRi,1) \\ &= TCj(i(1 + i)/(1 + i) - 1) \\ &= TCj(1 + i) \end{aligned}$$

In our example, for $i = .12$ in Year 8, then

$$\begin{aligned} ACn &= \$18,723(1 + .12) \\ AC8 &= \$20,970 \end{aligned}$$

We may write the equation in its entirety. That is,

$$\begin{aligned} AC &= [Ln - Ln,1(SPWi,1) + X(SPWi,1)]UCRi,1 \\ &= [Ln - Ln+1/(1 + i) + X/(1 + i)](i(1 + i)/(1 + i) -1) \\ &= [Ln - Ln+1/(1 + i) + X/(1 + i)](1 + i) \\ &= Ln(1 + i) - Ln+1 + X \end{aligned}$$

This equation is equivalent to the equation in the consultant's report.

If one adds and subtracts $(Ln+1)i$ to the equation, then:

$$\begin{aligned} AC &= Ln(1 + i) - Ln+1 + (Ln+1)i - (Ln+1)i + X \\ &= Ln(1 + i) - Ln+1\ (1 + i) - (Ln+1)i + X \\ &= (Ln - Ln+1)(1 + i) + (Ln+1)i + X \end{aligned}$$

II. MODEL ANALYSIS

A. Overview

The three equations used for replacement analysis were:

1) Equivalent Annual Costs of New Equipment

$$ACn = [P - Ln/(1 + i)^n + \sum_{J-1}^{n} \frac{Xj}{(1 + 1)^j}](i(1 + i)^n/(1 + i)^n - 1)$$

2) Salvage Value

$$Ln = P(C^n)$$

3) Annual Cost of an Existing Unit

$$AC = (Ln - Ln+1)(1 + i) + Ln+1i + X$$

All three equations are valid equations for replacement analysis. In the consultant's report, equation 1 was not written correctly; however, it was used correctly in the example near the end of the report.

Equations 1 and 3 depend heavily upon the salvage value formula even though the depreciation factor for determining salvage is, at best, a guess. Similar problems exist when trying to determine interest rates for 7 or 8 years in advance to arrive at an annual cost for new equipment.

The computer code (PL/1) used by the MDH to generate replacement analysis output on current equipment was examined. The code appears to be logically correct and the output from the code appears to be mathematically correct.

B. Interest Rate Sensitivity

Equations 1 and 3 were examined for sensitivity to interest rates when other variables were held constant (see Appendix A for output). The results of this analysis are presented in Table 2. As illustrated in Table 2, the decision process is unaffected by the interest rates, given that all other factors remain constant. Furthermore, the length of time one should keep a new purchase in order to minimize costs does not decrease until the interest rates drop to 3 percent.

TABLE 2

HIGHWAY DEPARTMENT EQUIPMENT REPLACEMENT COST ANALYSIS
INTEREST RATE SENSITIVITY ANALYSIS

Interest Rate	--------- New Purchase -------		Cost to Keep Old	Decision
	Years to Keep	Annual Cost		
.16	6	$21,158	$21,237	Buy
.15	6	$20,803	$21,170	Buy
.14	6	$20,453	$21,103	Buy
.13	6	$20,106	$21,036	Buy
.12	6	$19,762	$20,970	Buy
.11	6	$19,422	$20,903	Buy
.10	6	$19,086	$20,836	Buy
.09	6	$18,754	$20,769	Buy
.08	6	$18,426	$20,703	Buy
.07	6	$18,102	$20,636	Buy
.06	6	$17,782	$20,569	Buy
.05	6	$17,467	$20,502	Buy
.04	6	$17,155	$20,436	Buy
.03	5	$16,847	$20,369	Buy

Note: Assume existing unit is 7 years old with an operating cost of $18,500 in the 8th year.

C. Depreciation Rate Sensitivity

The replacement analysis equation was also examined for sensitivity to depreciation rates assuming other variables remain constant. The results of this analysis are presented in Table 3.

TABLE 3

HIGHWAY DEPARTMENT EQUIPMENT REPLACEMENT COST ANALYSIS
DEPRECIATION RATE SENSITIVITY

Depreciation Factor	New Purchase Years to Keep	New Purchase Annual Cost	Annual Cost to Keep Old	Decision
.95	2	$15,315	$24,436	Buy
.90	4	$17,119	$23,761	Buy
.85	5	$18,396	$22,827	Buy
.80	6	$19,244	$21,855	Buy
.75	6	$19,762	$20,970	Buy
.70	7	$20,131	$20,229	Buy
.65	7	$20,296	$19,652	Keep
.60	7	$20,401	$19,228	Keep
.55	7	$20,464	$18,933	Keep
.50	7	$20,501	$18,741	Keep

As illustrated in Table 3, the decision process depends heavily upon the depreciation factor if other variables remain constant. Sensitivity appears to change at the 65 to 70 percent factor level, a level very close to the assumed rate of 75 percent in the consultant's examples.

In reality, the depreciation factor for equipment is not constant over the life of the equipment. The same is also true of interest rates. To assume that we can project these factors correctly for n years and that these factors are constant over the n periods are major problems in completely relying upon mathematical equations in the decision process.

Also very important is the estimation of operating costs. The operation profile for each unit in the inventory list has very detailed information on historical fuel usage, shop usage, and downtime. These factors are then applied to current fuel rates and shop rates to arrive at the

"current cost" of operating equipment for each year of its age. No attempt is made to estimate future cost of fuel or the future cost of labor in determining the cost of operating a unit of equipment in Year n. Yet, we do devalue or discount this cost when we use the single present worth formula on future operating costs.

In conclusion, while the equations used in the replacement analysis are all valid mathematical equations and make sense from a capital budgeting standpoint, they do suffer from the usual crudeness of trying to use mathematics in the decision-making process. Replacement analysis should be used as a tool in the decision-making process, with more importance being placed upon input from the operators of the equipment and those that repair the equipment.

APPENDIX A

INTEREST RATE SENSITIVITY TABLES

TABLE 1
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.16
Number of Years (n)	8
Depreciation Value (C	.75

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$37,500	1.16000	$32,328	$17,672	$6,850	$5,905	$23,577	$27,349
2	$28,125	1.34560	$20,901	$29,099	$7,200	$5,351	$40,355	$25,140
3	$21,094	1.56090	$13,514	$36,486	$7,740	$4,959	$52,701	$23,466
4	$15,821	1.81064	$8,738	$41,262	$8,620	$4,761	$62,238	$22,242
5	$11,866	2.10034	$5,650	$44,350	$10,680	$5,085	$70,411	$21,504
6	$8,900	2.43640	$3,653	$46,347	$13,530	$5,553	$77,961	$21,158
7	$6,675	2.82622	$2,362	$47,638	$17,640	$6,242	$85,494	$21,169
8	$5,006	3.27841	$1,527	$48,473	$22,066	$6,731	$93,060	$21,425

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $21,237.

TABLE 2
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.15
Number of Years (n)	8
Depreciation Value (C	.75

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$37,500	1.15000	$32,609	$17,391	$6,850	$5,957	$23,348	$26,850
2	$28,125	1.32250	$21,267	$28,733	$7,200	$5,444	$40,134	$24,687
3	$21,094	1.52088	$13,870	$36,130	$7,740	$5,089	$52,620	$23,046
4	$15,821	1.74901	$9,046	$40,954	$8,620	$4,929	$62,373	$21,847
5	$11,866	2.01136	$5,899	$44,101	$10,680	$5,310	$70,830	$21,130
6	$8,900	2.31306	$3,848	$46,152	$13,530	$5,849	$78,730	$20,803
7	$6,675	2.66002	$2,509	$47,491	$17,640	$6,632	$86,701	$20,839
8	$5,006	3.05902	$1,636	$48,364	$22,066	$7,213	$94,787	$21,123

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $21,170.

TABLE 1
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.14
Number of Years (n)	8
Depreciation Value (C	.75

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$37,500	1.14000	$32,895	$17,105	$6,850	$6,009	$23,114	$26,350
2	$28,125	1.29960	$21,641	$28,359	$7,200	$5,540	$39,908	$24,236
3	$21,094	1.48154	$14,238	$35,762	$7,740	$5,224	$52,535	$22,628
4	$15,821	1.68896	$9,367	$40,633	$8,620	$5,104	$62,510	$21,454
5	$11,866	1.92541	$6,163	$43,837	$10,680	$5,547	$71,261	$20,757
6	$8,900	2.19497	$4,055	$45,945	$13,530	$6,164	$79,533	$20,453
7	$6,675	2.50227	$2,668	$47,332	$17,640	$7,050	$87,970	$20,514
8	$5,006	2.85259	$1,755	$48,245	$22,066	$7,735	$96,618	$20,828

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $21,103.

TABLE 2
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.13
Number of Years (n)	8
Depreciation Value (C	.75

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$37,500	1.13000	$33,186	$16,814	$6,850	$6,062	$22,876	$25,850
2	$28,125	1.27690	$22,026	$27,974	$7,200	$5,639	$39,675	$23,785
3	$21,094	1.44290	$14,619	$35,381	$7,740	$5,364	$52,446	$22,212
4	$15,821	1.63047	$9,703	$40,297	$8,620	$5,287	$62,649	$21,062
5	$11,866	1.84244	$6,440	$43,560	$10,680	$5,797	$71,709	$20,388
6	$8,900	2.08195	$4,275	$45,725	$13,530	$6,499	$80,373	$20,106
7	$6,675	2.35261	$2,837	$47,163	$17,640	$7,498	$89,309	$20,194
8	$5,006	2.65844	$1,883	$48,117	$22,066	$8,300	$98,563	$20,539

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $21,036.

TABLE 1
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.12
Number of Years (n)	8
Depreciation Value (C	.75

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$37,500	1.12000	$33,482	$16,518	$6,850	$6,116	$22,634	$25,350
2	$28,125	1.25440	$22,421	$27,579	$7,200	$5,740	$39,435	$23,334
3	$21,094	1.40493	$15,014	$34,986	$7,740	$5,509	$52,351	$21,796
4	$15,821	1.57352	$10,055	$39,945	$8,620	$5,478	$62,788	$20,672
5	$11,866	1.76234	$6,733	$43,267	$10,680	$6,060	$72,170	$20,021
6	$8,900	1.97382	$4,509	$45,491	$13,530	$6,855	$81,249	$19,762
7	$6,675	2.21068	$3,019	$46,981	$17,640	$7,979	$90,718	$19,878
8	$5,006	2.47596	$2,022	$47,978	$22,066	$8,912	$100,627	$20,257

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $20,970.

TABLE 2
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.11
Number of Years (n)	8
Depreciation Value (C	.75

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$37,500	1.13000	$33,186	$16,814	$6,850	$6,062	$22,876	$25,850
2	$28,125	1.27690	$22,026	$27,974	$7,200	$5,639	$39,675	$23,785
3	$21,094	1.44290	$14,619	$35,381	$7,740	$5,364	$52,446	$22,212
4	$15,821	1.63047	$9,703	$40,297	$8,620	$5,287	$62,649	$21,062
5	$11,866	1.84244	$6,440	$43,560	$10,680	$5,797	$71,709	$20,388
6	$8,900	2.08195	$4,275	$45,725	$13,530	$6,499	$80,373	$20,106
7	$6,675	2.35261	$2,837	$47,163	$17,640	$7,498	$89,309	$20,194
8	$5,006	2.65844	$1,883	$48,117	$22,066	$8,300	$98,563	$20,539

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $20,903.

TABLE 1
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.1
Number of Years (n)	8
Depreciation Value (C	.75

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$37,500	1.10000	$34,091	$15,909	$6,850	$6,227	$22,136	$24,350
2	$28,125	1.21000	$23,244	$26,756	$7,200	$5,950	$38,933	$22,433
3	$21,094	1.33100	$15,848	$34,152	$7,740	$5,815	$52,144	$20,968
4	$15,821	1.46410	$10,806	$39,194	$8,620	$5,888	$63,074	$19,898
5	$11,866	1.61051	$7,368	$42,632	$10,680	$6,631	$73,143	$19,295
6	$8,900	1.77156	$5,024	$44,976	$13,530	$7,637	$83,124	$19,086
7	$6,675	1.94872	$3,425	$46,575	$17,640	$9,052	$93,775	$19,262
8	$5,006	2.14359	$2,335	$47,665	$22,066	$10,294	$105,159	$19,711

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $20,836.

TABLE 2
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.09
Number of Years (n)	8
Depreciation Value (C	.75

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$37,500	1.09000	$34,404	$15,596	$6,850	$6,284	$21,880	$23,849
2	$28,125	1.18810	$23,672	$26,328	$7,200	$6,060	$38,672	$21,984
3	$21,094	1.29503	$16,288	$33,712	$7,740	$5,977	$52,033	$20,556
4	$15,821	1.41158	$11,208	$38,792	$8,620	$6,107	$63,220	$19,514
5	$11,866	1.53862	$7,712	$42,288	$10,680	$6,941	$73,657	$18,937
6	$8,900	1.67710	$5,307	$44,693	$13,530	$8,067	$84,129	$18,754
7	$6,675	1.82804	$3,651	$46,349	$17,640	$9,650	$95,435	$18,962
8	$5,006	1.99256	$2,512	$47,488	$22,066	$11,074	$107,648	$19,449

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $20,769.

TABLE 1
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.08
Number of Years (n)	8
Depreciation Value (C	.75

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$37,500	1.08000	$34,722	$15,278	$6,850	$6,343	$21,621	$23,351
2	$28,125	1.16640	$24,113	$25,887	$7,200	$6,173	$38,403	$21,535
3	$21,094	1.25971	$16,745	$33,255	$7,740	$6,144	$51,915	$20,145
4	$15,821	1.36049	$11,629	$38,371	$8,620	$6,336	$63,367	$19,132
5	$11,866	1.46933	$8,076	$41,924	$10,680	$7,269	$74,189	$18,581
6	$8,900	1.58687	$5,609	$44,391	$13,530	$8,526	$85,182	$18,426
7	$6,675	1.71382	$3,895	$46,105	$17,640	$10,293	$97,189	$18,667
8	$5,006	1.85093	$2,705	$47,295	$22,066	$11,922	$110,301	$19,194

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $20,703.

TABLE 2
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.07
Number of Years (n)	8
Depreciation Value (C	.75

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$37,500	1.07000	$35,047	$14,953	$6,850	$6,402	R21,355	$22,850
2	$28,125	1.14490	$24,565	$25,435	$7,200	$6,289	$38,126	$21,087
3	$21,094	1.22504	$17,219	$32,781	$7,740	$6,318	$51,790	$19,735
4	$15,821	1.31080	$12,070	$37,930	$8,620	$6,576	$63,515	$18,751
5	$11,866	1.40255	$8,460	$41,540	$10,680	$7,615	$74,740	$18,228
6	$8,900	1.50073	$5,930	$44,070	$13,530	$9,016	$86,286	$18,102
7	$6,675	1.60578	$4,157	$45,843	$17,640	$10,985	$99,044	$18,378
8	$5,006	1.71819	$2,914	$47,086	$22,066	$12,843	$113,130	$18,946

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $20,636.

TABLE 1
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.06
Number of Years (n)	8
Depreciation Value (C	.75

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$37,500	1.06000	$35,377	$14,623	$6,850	$6,462	$21,085	$22,350
2	$28,125	1.12360	$25,031	$24,969	$7,200	$6,408	$37,839	$20,639
3	$21,094	1.19102	$17,711	$32,289	$7,740	$6,499	$51,658	$19,326
4	$15,821	1.264248	$12,532	$37,468	$8,620	$6,828	$63,665	$18,373
5	$11,866	1.33823	$8,867	$41,133	$10,680	$7,981	$75,311	$17,879
6	$8,900	1.41852	$6,274	$43,726	$13,530	$9,538	$87,442	$17,782
7	$6,675	1.50363	$4,439	$45,561	$17,640	$11,732	$101,009	$18,094
8	$5,006	1.59385	$3,141	$46,859	$22,066	$13,844	$116,151	$18,704

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $20,569.

TABLE 2
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.05
Number of Years (n)	8
Depreciation Value (C	.75

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$37,500	1.05000	$35,714	$14,286	$6,850	$6,524	$20,810	$21,851
2	$28,125	1.10250	$25,510	$24,490	$7,200	$6,531	$37,545	$20,192
3	$21,094	1.15763	$18,222	$31,778	$7,740	$6,686	$51,519	$18,918
4	$15,821	1.21551	$13,016	$36,984	$8,620	$7,092	$63,817	$17,997
5	$11,866	1.27628	$9,297	$40,703	$10,680	$8,368	$75,904	$17,532
6	$8,900	1.34010	$6,641	$43,359	$13,530	$10,096	$88,656	$17,467
7	$6,675	1.40710	$4,744	$45,256	$17,640	$12,536	$103,089	$17,816
8	$5,006	1.47746	$3,388	$46,612	$22,066	$14,935	$119,380	$18,471

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $20,502.

TABLE 1
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.04
Number of Years (n)	8
Depreciation Value (C	.75

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$37,500	1.04000	$36,058	$13,942	$6,850	$6,587	$20,529	$21,350
2	$28,125	1.08160	$26,003	$23,997	$7,200	$6,657	$37,241	$19,745
3	$21,094	1.12486	$18,752	$31,248	$7,740	$6,881	$51,373	$18,512
4	$15,821	1.16986	$13,524	$36,476	$8,620	$7,368	$63,969	$17,623
5	$11,866	1.21665	$9,753	$40,247	$10,680	$8,778	$76,518	$17,188
6	$8,900	1.26532	$7,034	$42,966	$13,530	$10,693	$89,930	$17,155
7	$6,675	1.31593	$5,072	$44,928	$17,640	$13,405	$105,297	$17,543
8	$5,006	1.36857	$3,658	$46,342	$22,066	$16,123	$122,834	$18,244

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $20,436.

TABLE 2
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.03
Number of Years (n)	8
Depreciation Value (C	.75

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$37,500	1.03000	$36,408	$13,592	$6,850	$6,650	$20,242	$20,849
2	$28,125	1.06090	$26,511	$23,489	$7,200	$6,787	$36,926	$19,298
3	$21,094	1.09273	$19,304	$30,696	$7,740	$7,083	$51,216	$18,106
4	$15,821	1.12551	$14,057	$35,943	$8,620	$7,659	$64,122	$17,251
5	$11,866	1.15927	$10,236	$39,764	$10,680	$9,213	$77,156	$16,847
6	$8,900	1.19405	$7,454	$42,546	$13,530	$11,331	$91,269	$16,848
7	$6,675	1.22987	$5,427	$44,573	$17,640	$14,343	$107,639	$17,277
8	$5,006	1.26677	$3,952	$46,048	$22,066	$17,419	$126,533	$18,025

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $20,369.

APPENDIX B

DEPRECIATION RATE SENSITIVITY TABLES

TABLE 1
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.12
Number of Years (n)	8
Depreciation Value (C	.95

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$47,500	1.12000	$42,411	$7,589	$6,850	$6,116	$13,705	$15,350
2	$45,125	1.25440	$35,973	$14,027	$7,200	$5,740	$25,883	$15,315
3	$42,869	1.40493	$30,513	$19,487	$7,740	$5,509	$36,852	$15,343
4	$40,726	1.57352	$25,882	$24,118	$8,620	$5,478	$46,961	$15,461
5	$38,690	1.76234	$21,954	$28,046	$10,680	$6,060	$56,949	$15,798
6	$36,756	1.97382	$18,622	$31,378	$13,530	$6,855	$67,136	$16,329
7	$34,918	2.21068	$15,795	$34,205	$17,640	$7,979	$77,942	$17,078
8	$33,172	2.47596	$13,398	$36,602	$22,066	$8,912	$89,251	$17,966

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $24,436.

TABLE 2
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.12
Number of Years (n)	8
Depreciation Value (C	.9

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$45,000	1.12000	$40,179	$9,821	$6,850	$6,116	$15,937	$17,849
2	$40,500	1.25440	$32,286	$17,714	$7,200	$5,740	$29,570	$17,497
3	$36,450	1.40493	$25,944	$24,056	$7,740	$5,509	$41,421	$17,246
4	$32,805	1.57352	$20,848	$29,152	$8,620	$5,478	$51,995	$17,119
5	$29,525	1.76234	$16,753	$33,247	$10,680	$6,060	$62,150	$17,241
6	$26,573	1.97382	$13,463	$36,537	$13,530	$6,855	$72,295	$17,584
7	$23,916	2.21068	$10,818	$39,182	$17,640	$7,979	$82,919	$18,169
8	$21,524	2.47596	$8,693	$41,307	$22,066	$8,912	$93,956	$18,914

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $23,761.

TABLE 1
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.12
Number of Years (n)	8
Depreciation Value (C	.85

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$42,500	1.12000	$37,946	$12,054	$6,850	$6,116	$18,170	$20,350
2	$36,125	1.25440	$28,799	$21,201	$7,200	$5,740	$33,057	$19,560
3	$30,706	1.40493	$21,856	$28,144	$7,740	$5,509	$45,509	$18,948
4	$26,100	1.57352	$16,587	$33,413	$8,620	$5,478	$56,256	$18,521
5	$22,185	1.76234	$12,588	$37,412	$10,680	$6,060	$66,315	$18,396
6	$18,857	1.97382	$9,554	$40,446	$13,530	$6,855	$76,204	$18,535
7	$16,028	2.21068	$7,250	$42,750	$17,640	$7,979	$86,487	$18,951
8	$13,624	2.47596	$5,503	$44,497	$22,066	$8,912	$97,146	$19,556

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $22,827.

TABLE 2
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.12
Number of Years (n)	8
Depreciation Value (C	.8

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$40,000	1.12000	$35,714	$14,286	$6,850	$6,116	$20,402	$22,850
2	$32,000	1.25440	$25,510	$24,490	$7,200	$5,740	$36,346	$21,506
3	$25,600	1.40493	$18,222	$31,778	$7,740	$5,509	$49,143	$20,461
4	$20,480	1.57352	$13,015	$36,985	$8,620	$5,478	$59,828	$19,697
5	$16,384	1.76234	$9,297	$40,703	$10,680	$6,060	$69,606	$19,309
6	$13,107	1.97382	$6,640	$43,360	$13,530	$6,855	$79,118	$19,244
7	$10,486	2.21068	$4,743	$45,257	$17,640	$7,979	$88,994	$19,500
8	$8,389	2.47596	$3,388	$46,612	$22,066	$8,912	$99,261	$19,982

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $21,855.

TABLE 1
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.12
Number of Years (n)	8
Depreciation Value (C	.75

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$37,500	1.12000	$33,482	$16,518	$6,850	$6,116	$22,634	$25,350
2	$28,125	1.25440	$22,421	$27,579	$7,200	$5,740	$39,435	$23,334
3	$21,094	1.40493	$15,014	$34,986	$7,740	$5,509	$52,351	$21,796
4	$15,821	1.57352	$10,055	$39,945	$8,620	$5,478	$62,788	$20,672
5	$11,866	1.76234	$6,733	$43,267	$10,680	$6,060	$72,170	$20,021
6	$8,900	1.97382	$4,509	$45,491	$13,530	$6,855	$81,249	$19,762
7	$6,675	2.21068	$3,019	$46,981	$17,640	$7,979	$90,718	$19,878
8	$5,006	2.47596	$2,022	$47,978	$22,066	$8,912	$100,627	$20,257

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $20,970.

TABLE 2
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.12
Number of Years (n)	8
Depreciation Value (C	.7

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$35,000	1.12000	$31,250	$18,750	$6,850	$6,116	$24,866	$27,850
2	$24,500	1.25440	$19,531	$30,469	$7,200	$5,740	$42,325	$25,044
3	$17,150	1.40493	$12,207	$37,793	$7,740	$5,509	$55,158	$22,965
4	$12,005	1.57352	$7,629	$42,371	$8,620	$5,478	$65,214	$21,471
5	$8,404	1.76234	$4,769	$45,231	$10,680	$6,060	$74,134	$20,565
6	$5,883	1.97382	$2,981	$47,019	$13,530	$6,855	$82,777	$20,133
7	$4,118	2.21068	$1,863	$48,137	$17,640	$7,979	$91,874	$20,131
8	$2,883	2.47596	$1,164	$48,836	$22,066	$8,912	$101,485	$20,429

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $20,229.

TABLE 1
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.12
Number of Years (n)	8
Depreciation Value (C	.65

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$32,500	1.12000	$29,018	$20,982	$6,850	$6,116	$27,098	$30,350
2	$21,125	1.25440	$16,841	$33,159	$7,200	$5,740	$45,015	$26,635
3	$13,731	1.40493	$9,773	$40,227	$7,740	$5,509	$57,592	$23,978
4	$8,925	1.57352	$5,672	$44,328	$8,620	$5,478	$67,171	$22,115
5	$5,801	1.76234	$3,292	$46,708	$10,680	$6,060	$75,611	$20,975
6	$3,771	1.97382	$1,911	$48,089	$13,530	$6,855	$83,847	$20,394
7	$2,451	2.21068	$1,109	$48,891	$17,640	$7,979	$92,628	$20,296
8	$1,593	2.47596	$643	$49,357	$22,066	$8,912	$102,006	$20,534

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $19,652.

TABLE 2
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.12
Number of Years (n)	8
Depreciation Value (C	.6

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$30,000	1.12000	$26,786	$23,214	$6,850	$6,116	$29,330	$32,850
2	$18,000	1.25440	$14,349	$35,651	$7,200	$5,740	$47,507	$28,110
3	$10,800	1.40493	$7,687	$42,313	$7,740	$5,509	$59,678	$24,847
4	$6,480	1.57352	$4,118	$45,882	$8,620	$5,478	$68,725	$22,627
5	$3,888	1.76234	$2,206	$47,794	$10,680	$6,060	$76,697	$21,276
6	$2,333	1.97382	$1,182	$48,818	$13,530	$6,855	$84,576	$20,571
7	$1,400	2.21068	$633	$49,367	$17,640	$7,979	$93,104	$20,401
8	$840	2.47596	$339	$49,661	$22,066	$8,912	$102,310	$20,595

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $19,228.

TABLE 1
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.12
Number of Years (n)	8
Depreciation Value (C	.55

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$27,500	1.12000	$24,554	$25,446	$6,850	$6,116	$31,562	$35,349
2	$15,125	1.25440	$12,058	$37,942	$7,200	$5,740	$49,798	$29,465
3	$8,319	1.40493	$5,921	$44,079	$7,740	$5,509	$61,444	$25,582
4	$4,575	1.57352	$2,907	$47,093	$8,620	$5,478	$79,936	$23,025
5	$2,516	1.76234	$1,428	$48,572	$10,680	$6,060	$77,475	$21,492
6	$1,384	1.97382	$701	$49,299	$13,530	$6,855	$85,057	$20,688
7	$761	2.21068	$344	$49,656	$17,640	$7,979	$93,393	$20,464
8	$419	2.47596	$169	$49,831	$22,066	$8,912	$102,480	$20,630

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $18,933.

TABLE 2
HIGHWAY DEPARTMENT REPLACEMENT COST ANALYSIS

Purchase Price (PP)	$50,000
Interest Rate (i)	.12
Number of Years (n)	8
Depreciation Value (C	.5

Year	Salvage Value L	Present Value Formula (1+i) n	Present Salvage Value L/(1+i) n	Present Cost Of Owning PCO	Operating Costs Xn	Present Value Operating Costs Xn/(1+i) n	Present Value Total Costs PVTC	Average Annual Cost ACn
1	$25,000	1.12000	$22,321	$27,679	$6,850	$6,116	$33,795	$37,850
2	$12,500	1.25440	$9,965	$40,035	$7,200	$5,740	$51,891	$30,704
3	$6,250	1.40493	$4,449	$45,551	$7,740	$5,509	$62,916	$26,195
4	$3,125	1.57352	$1,986	$48,014	$8,620	$5,478	$70,857	$23,329
5	$1,563	1.76234	$887	$49,113	$10,680	$6,060	$78,016	$21,642
6	$782	1.97382	$396	$49,604	$13,530	$6,855	$85,362	$20,762
7	$391	2.21068	$177	$49,823	$17,640	$7,979	$93,560	$20,501
8	$196	2.47596	$79	$49,921	$22,066	$8,912	$102,570	$20,648

The cost of keeping an existing unit that is 7 years old with operating costs of $18,500 in year 8 is $18,741.

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APPENDIX C

MATHEMATICAL ABBREVIATIONS

MATHEMATICAL ABBREVIATIONS

TCn = Total cost of owning equipment for n years

TLVn = Total loss in value of owning equipment for n years

TOCn = Total present value of operating costs for n years

SPWi,n = Single present worth equation with interest rate i for n years

UCRi,n = Uniform capital recovery equation with interest rate i for n years

PV = Present value

FV = Future value

ACn = Equivalent annual costs over n years

Ln = Future salvage value of equipment in n years

P = Purchase price of equipment

Xj = Operating cost in year j

i = Expected interest rate

FA = Future amount

I = Principal amount to be invested

C = Depreciation factor

n = Number of years

HIGHWAY RENTAL RATES

Table of Contents

Reference No.

Rate Calculation Policy 1100

Assigned Rate Procedure 1110

Usage Rate Procedure 1120

Net Income Statement 1130

Working Cash Statement 1140

HIGHWAY RENTAL RATE
CALCULATION PROCEDURE

Policy & Procedure

I. Purpose

This policy and procedure establishes the method for development of vehicle and equipment rental rates for the Department's fleet. It also identifies responsibilities and actions required.

II. Background

Rental rates recover all costs of operating the Department's fleet. There is an assigned rate that recovers fixed costs such as administration, insurance, depreciation and replacement. A usage rate is applied to each mile driven or hour of use to recover costs such as lubrication, labor, tires, fuel and parts. The rates are developed for each class and sub-class of vehicle or equipment within the fleet.

III. Policy

This policy establishes and defines responsibilities and reporting requirements associated with rental rate development and review.

IV. Responsibilities

Chief - Equipment Bureau - is responsible for the rental rate system.

Supervisor - Program Management Section - is responsible for establishing and monitoring the rental rates. Monthly reviews and comprehensive semi-annual reviews are conducted to determine the need for rate adjustments.

Manager - Audit Unit - periodically reviews the rental rates for procedural compliance and accuracy.

Administrator - Centralized Services Division - Approves the rental rates after development and provides accounting assistance to ensure GAAP compliance.

V. Procedure for establishing Rental Rates

The rental rates are based on financial information obtained from the Department accounting system. The rates are developed as follows.

- Determine earnings from SBAS Reports for the past rate period.
    - + Usage income
    - + Replacement income
    - + Depreciation income
    - + Assigned earnings
    - + Sale of equipment
    - + Other income
- Determine fleet costs.
    - + Assigned (insurance, depreciation, replacement, etc.)
    - + Usage (fuel, tires, parts, etc.)
- Determine yearly loss or gain.
    - + Financial statement
    - + Cash flow
- Determine assigned rate based on:
    - + Projected expense changes
    - + Carry forward loss/gain
    - + Estimated changes in depreciation
    - + Replacement funding
- Determine usage rate based on projected operating costs

ASSIGNED RENTAL RATE

The assigned rate is an hourly possession charge applied to a pre determined number of hours depending on the class or subclass. The assigned rate recovers:

- Insurance,
- Depreciation,
- Administration, and
- Replacement costs.

The assigned rate is based on the actual expenditures and may be adjusted for anticipated increases or decreases in:

- Insurance premiums,
- Number of units in a class or subclass,
- Change in depreciation,
- Administrative costs,
- Replacement funding
- Carry forward losses or gains.

An example of the assigned rate can be found in Section 1110 page 12.

Estimated Assigned Cost Increase or Decrease

The assigned rate is adjusted for the difference between actual and budgeted expenditures. The following is an example of the Estimated Cost Adjustment procedure:

Step I - Determine overall increases/decreases:

Actual 1000 and 2000 Expenditures	$2,000,000
Budgeted 1000 and 2000 Expenditures	$2,400,000
Total Cost Adjustment	+ 400,000

Step II - Establish assigned cost increase/decrease:

The total cost adjustment is	+ $	400,000
multiplied by the percent of total expenditures that were assigned costs	x	.70
Total assigned costs adjustment	+	280,000

Step III - Established assigned rate adjustment:

Total assigned costs adjustment	+ $	280,000
divided by total assigned hours		7,000,000

Equals assigned cost rate adjustment per hour: $ 0.0400

Step 2 Establish Assigned Cost Increase or Decrease

Data used in determining the assigned adjustment is obtained from EMS REPORT EB007 "State highway operating cost report totals".

Total Usage Cost $ ______________(1)

(Useage cost figure is required in these computations to establish percent of total cost. The figure is also used in usage rate development Section 1120)

Total Assigned Cost $ ______________(2)

* Total Depreciation - ______________(3)

Total Assigned Costs Less Depreciation $ ______________(4)

Total costs $ ______________(5)

(1 + 4)

Percent of the total costs that is usage: ______________%(6)

(Total usage cost (1) divided by total costs (5)) (1 ÷ 5)

(Used in usage rate development Section 1120)

Percent of the total costs that is assigned: ______________%(7)

(Total assigned costs (4) divided by total costs(5)) (4 ÷ 5)

* Depreciation is included in the total assigned cost and must be deducted. Depreciation adjustments are handled separately.

Assigned Rate Adjustment Worksheet

Step 1 Overall Increase or Decrease

All data for this portion of the adjustment process is obtained from SBAS 662 Reports for Center 8000 "Equipment Reporting Center".

Base Year Actual Expenditures

1000 Personal Services $ ____________________(1)

2000 Operating Expenses $ ____________________(2)

Total Personal Services and Operating Expenses $ ____________(3)

(1 + 2)

Rate Year Budgeted Expenditures

1000 Personal Services $ ____________________(4)

2000 Operating Expenses $ ____________________(5)

Total Personal Services and Operating Expenses $ ____________(6)

(4 + 5)

Total Cost Adjustment $ ____________(7)

(6 - 3)

(Also used in usage rate adjustment Section 1120)

Estimated assigned cost increase/decrease

Estimated Total Cost increase/decrease, $ ______________(1)
(Step 1, item 7, page 3)

Percent of the total cost that is assigned;x ______________(2)
(Step 2, item 7, page 4)

Total assigned cost adjustment. $ ______________(3)

(Estimated increase/decrease (1) times

percent of the total costs that are assigned (2))

Step 3 Assigned Rate Adjustment

Total assigned cost adjustment; $ ______________(3)

(Step 2, item 3, page 5)

divided by total assigned hours; ______________

Equals Assigned Cost rate

adjustment per hour. $ 0.______________

Prior Year Adjustment

Prior year gain or loss is considered in each years rental rates. The adjustment is obtained from the appropriate year net income statement.

Example: FY 90 gain/loss will be considered in FY 92 rental rates.

The Loss/Gain is expressed as an assigned cost per hour and is applied to all classes. The following is an example of the prior year adjustment process:

Carry forward Gain/Loss;	+ $ 210,000
divided by total assigned hours;	7,000,000
equals prior year adjustment per assigned hour	- $ 0.0300

Note: A prior year gain is a reduction in the current rates, and a prior year loss is an increase in the current rate.

Prior Year Gain or Loss Worksheet

Carry forward loss or gain $ ______________

(carry forward loss or gain is taken from the appropriate net income statement. See net income statement EMS-1130)

Estimated total assigned hours ______________

(Total assigned hours are determined by multiplying the number of units in each class by the yearly assigned hours and totalling the hours. See current rental rates for yearly unit class assigned hours.)

Carry forward gain/loss rate adjustment per hour: $ _____.________

(Gain or loss is divided by the total assigned hours.)

Note: All gains carried forward will be a reduction in the current rate year, and all losses carried forward will be an increase in the current rate year.

Replacement Funding Adjustment

Replacement funding is designed to finance the difference between vehicle and equipment depreciation and actual replacement costs. The yearly replacement funding requirement is detailed on the cash flow and net income statements for the rate year.

The replacement funding rate per hour is determined by dividing the approved replacement funding level by the total assigned hours. The rate per hour is them included in the total assigned hourly rate.

The following is an example of determining the replacement rate per hour:

Replacement funding approved		$1,400,000
divided by estimated total assigned hours;	7,000,000	
Equals replacement rate per assigned hour:		$ 0.2000

Replacement Funding Worksheet

Replacement Funding Required: $ ____________________

(Yearly replacement funding from the rate year net income statement EMS-1130)

Estimated total assigned hours ____________________

(Total assigned hours are determined by multiplying the number of units in each class by the yearly assigned hours and totalling all of the class assigned hours.)

Replacement funding rate per hour: $______.______________

(Approved replacement funding is divided by the total assigned hours)

Replacement rate is added to the base hourly rate of all classes.

Depreciation Adjustment

The depreciation adjustment is based on the number and price of units detailed on the Biennium Equipment Replacement Schedule. Because of purchasing schedules and actual delivery dates only the last years purchases affect the current year depreciation. The following is an example of the depreciation adjustment process:

Actual total depreciation expense		$ 3,000,000
Plus total assigned cost adjustments	+	280,000
equals adjusted depreciation		$ 3,280,000

The difference between adjusted and financial statement depreciation must be as close to zero as possible.

Depreciation Adjustment Worksheet

Class ____________

Step 1 - Estimated yearly depreciation

Estimated new unit purchase price; $ ________________

times % depreciated monthly; x ________________
(From Rental Rate depreciation schedule)

equals monthly depreciation $ ________________

times months x ______12______

equals yearly depreciation $ ______________(1)

Step 2 - Estimated total depreciation increase

Yearly depreciation; $ ______________(1)

time number of new units; x __________________
(from biennium equipment
request)

equals total depreciation $ ______________(2)
increase.

Step 3 - Depreciation adjustment per hour assigned.

Total depreciation Incease $ ______________(2)

divided by yearly class assigned
hours ÷ ________________

divided by the number of units
in the class ÷ ________________

equal class depreciation adjustment
per hour assigned $ ___.______________

Actual Assigned Rate

The following is an example of the assigned rate including all adjustments:

Actual assigned rate per hour	$ 1.0000
Adjustment for assigned cost increase	+ 0.0400
Adjustment for prior year gain or loss	- 0.3000
Adjustment for replacement funding requirement	+ 0.0200
Adjustment for depreciation increase	+ 0.0400
Actual assigned rate charged per hour	$ 1.0700

USAGE RENTAL RATE

A usage rental rate is charged for every mile driven or hour used. The usage rate is designed to recover operating costs such as:

- Direct repair labor;
- Fuel;
- Parts;
- Tires and tubes; and,
- Other operating costs charged directly to a unit.

The rate is changed for each mile driven for units in class 00 through class 29 and for each hour of use for units in class 30 and 32. Example of units: cars, pickups, vans, dump trucks, paint strippers, transport tractors, loaders and motor patrols.

Only units that are mobile and high usage are changed in the remaining classes. For a complete listing of usage rates see current year rental rates.

USAGE RATE WORKSHEET

Review the Assigned Rate Adjustment Worksheet for the Usage Rate Development information.

Estimated Total Costs
increase/decrease $________________
(Assigned Rate step 1, item 7,
page 3)

Percent total costs that is usage x ________________ %
(Assigned rate, step 2 calculations,
item 6, page 4)

Usage Rate Adjustment Amount $________________
(Total cost increase/decrease
times percent usage)

Actual Expenditures $________________
(Assigned rate, step 2,
item 1, page 4)

Percent Increase/Decrease ________.________ %
(Actual Expenditures divided
into adjustment amount)

The Usage Percent of Increase/Decrease is applied to actual per mile or per hour operating costs by class or subclass.

Actual class/subclass operating costs are obtained from EMS Report 21 "Highway Equipment Operating Cost Report".

EMS-1130

NET INCOME

The net income statement is a consolidation of all revenues and expenditures for a fiscal year. The data for the statement is taken from Statewide Budgeting and Accounting System (SBAS) Reports. The difference between revenues and expenditure is either a loss or gain. All loss or gains are adjusted in succeeding year rental rates. For example, loss in FY 90 would be recovered in the rental rates for FY 92. This is referred to as the "Leap Frog" method. Operations and asset positions are seperated to ensure that capital asset gains or losses are not used to offset operations. This ensures an accurate accounting of the Equipment Bureaus financial position.

EMS-1130

NET INCOME WORKSHEET

OPERATIONS AND ASSETS

FY: ____________

REVENUES: SBAS REPORT: 632 ACCOUNTING ENTITY: 06508

OBJ/REV	DESCRIPTION	OPERATIONS	CAPITAL ASSETS
1000	Administrative Fees	$________	
1703	Equipment Usage	________	
1705	Equipment Replacement		____________
1706	Equipment Depreciation		____________
1707	Equipment Overhead	________	
2180	Sale of Equipment		____________
____	____________________	________	____________
____	____________________	________	____________
	TOTAL REVENUES +	$________	+ $____________

EXPENDITURES: SBAS CENTER: 8000 ACCOUNTING ENTITY: 06508

REPORT	DESCRIPTION	OPERATIONS	CAPITAL ASSETS
662	1000 Personnel Services	$________	
662	2000 Operating Expenses	________	
661	2616 Bad Debts	________	
661	2808 Loss on Sale		____________
411	5208 Prior Year	________	
411	1709 Depreciation		____________
632	1705 Equipment Replacement		____________
____	____________________	________	____________
____	____________________	________	____________
	TOTAL EXPENDITURES -	$________	- $____________

Revenue Minus Expenditures ((loss)/+ gain for the year)	$________	$____________
Adjustment FY _____ Carry Forward Loss/Gain	$________	$____________
FY _____ Actual (Loss)/Gain to Carry Forward to FY ____	$________	$____________

EMS-1140

CASH PROJECTION

The cash projection statement is designed to show the source, use, and current status of proprietary fund cash. SBAS data is consolidated onto one worksheet to detail a cash position at the end of each fiscal year. The Equipment Program Proprietary fund maintains approximately 45 days of working cash excluding any prior year loss or gains.

Operations and asset cash are separated to ensure that capital asset gains or losses are not used to offset operations. The capital asset working cash will balance as close as possible to zero.

CASH PROJECTION WORKSHEET

CASH POSITION WORKSHEET FY _____

		OPERATIONS	CAPITAL ASSETS
Beginning Working Cash (see attached worksheet)		$_____	$_____
Revenues: (From Income Statement)			
1703 Equipment Usage		_____	
1705 Equipment Replacement			_____
1706 Equipment Depreciation			_____
7107 Equipment Overhead		_____	
2180 Sale of Equipment			_____
____ _____________		_____	_____
____ _____________		_____	_____
Total Beginning Working Cash and Revenues	+	$_____	+ $_____

Total Operations and Capital Asset + $_____

		OPERATIONS	CAPITAL ASSETS
Expenditures: (SBAS: Report 662 Center 8000)			
1000 Personnel Services		$_____	
2000 Operating Expenditures		_____	
3000 Capital Equipment			_____
Total Expenditures	-	$_____	- $_____

Total Operations and Capital Asset Expenditures - $_____

Fiscal Year End Cash $_____ $_____
(Total Beginning Working Cash and Revenues Minus Expenditures)

FISCAL YEAR END TOTAL WORKING CASH $_____
(Fiscal Year-end Operation and Capital Asset Working Cash)

Fiscal Year-end Cash Detail:

1000 Personnel Services		$_____	
2000 Operating Expenses		_____	
Total:		$_____	
divided by 12 months;	÷	12	
times 1.5 months;	x	1.5	
equals 45 days working cash			$_____
FY _____ (Last Year Gain/Loss)			_____
FY _____ (Current Year Gain/Loss)			_____
Total Working Cash			$_____

EMS-1140

Beginning Cash - Worksheet

FY ____________

(SBAS: 411 Accounting Entity: ____________

+ 1104 Cash in treasury	+ $ ____________
+ 1203 Accounts receivables	+ $ ____________
+ 1302 Due from Federal Government	$ ____________
+ 1306 Due from other Entities	+ $ ____________
+ 1345 Due from - FYE cash cuttoff	+ $ ____________
+ ____ ________________	+ $ ____________
+ ____ ________________	+ $ ____________
+ ____ ________________	+ $ ____________
- 1212 Allowance for uncollectable Accounts	- $ ____________
- 2145 Accounts Pay - FYE cash Cutt off adjustment	- $ ____________
- 2301 Accrude Expenditures	- $ ____________
- 2345 Due to - FYE Cash Cutt off Adjustment	- $ ____________
- ____ ________________	- $ ____________
- ____ ________________	- $ ____________
- ____ ________________	- $ ____________
Difference is actual cash	$ ____________

EQUIPMENT BUREAU

NUMBERED MEMOS

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(Policies updated have had minor language changes and should be reviewed)	
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NUMBERED MEMO

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Department Vehicle Use Policy 1289.11

JH:1:by:sk:227B/9

POLICY
FOR
MODIFICATIONS TO DEPARTMENT VEHICLES AND EQUIPMENT

DEFINITIONS AND TERMS

Functional Improvement -- consist of minor changes or additions to a unit or component to improve the purpose for which it was intended or to better meet requirements of a specific area and such changes will not affect the operational design of the unit.

Examples of items in this category may be: reinforcing the discharge chute on a plow; reinforcing a backhoe bucket; lining a sander with plywood to prevent erosion; adding a light bar and light to a pickup; etc.

These types of changes may be approved by the Maintenance Chief as long as the work does not exceed $200 for materials and/or 20 hours for labor. The Maintenance Chief, at his discretion, may delegate approval to the Shop Superintendent.

Design Change -- consists of changes to the design of the unit or component that corrects a malfunctioning feature or adds a feature that is needed for a specific area or that improves versatility.

Examples of items in this category may be: hydraulic system revisions; electrical system revisions; sander revisions; removal or change to factory installed parts; etc.

These types of changes require approval from the Equipment Bureau and will generally require less than $300.00 for materials and/or 30 hours for labor.

Major Modifications -- consists of a major change, revision or addition to a unit or component that changes the design intent or results in an expenditure for materials, parts and/or labor that requires re-evaluation of the unit for depreciation and rental rate purposes.

Examples of items in this category may be: converting a dump truck to a fifth wheel tractor; relocation of the dump box; installation of cabs on paint stripers; structural changes to the frame, axle or springs; etc.

Major modifications require review and approval from the Equipment Bureau.

POLICY

All changes to Department vehicles, equipment or components shall be documented on the Equipment Modification Report.

Requested changes shall be approved by the appropriate authority prior to the work being accomplished.

Once approval is received for a specific type of change involving a functional improvement or design change, no further Equipment Modification Reports need be

submitted for the same changes to other units. Equipment Modification Reports will be required for all Major Modifications.

The Equipment Modification Report may also be originated by the Equipment Bureau to initiate changes recommended by manufacturers.

PROCEDURE

Form EB85-1 -- Equipment Modification Report -- is a three part form that is to be filled out for all changes to Department vehicles or equipment.

The form will be initiated by either the Shop Superintendent or Equipment Bureau.

The form should be filled out as follows:

1. SUBMITTED FOR: -- check the appropriate box to reflect either work that was approved and accomplished locally or a request for Equipment Bureau approval.
2. TYPE OF CHANGE: -- check the appropriate box for the proper category of work to be done or the one that best describes the work to be done.
3. Enter the unit number if a specific unit is involved or enter the class if more than one unit is involved. In the latter case, indicate the number of units involved.
4. Briefly describe the reason the work is required on the unit, component or item that is malfunctioning.
5. Describe what changes are going to be made. If the work is difficult to describe, attach photographs, drawings, etc. If more space is needed, continue the explanation on a separate sheet of paper and attach it to the submittal.
6. Estimate the cost of labor, parts and materials for one unit or application and also reflect the total cost for all units or applications involved.
7. This section is to be completed and signed by either the Maintenance Chief or Shop Superintendent regardless of whether the work is approved locally or submitted to the Equipment Bureau for approval.
8. This section is for Equipment Bureau use only.
9. The remarks section is provided for additional comments or instructions and may be used by either the originating office or Equipment Bureau.

Distribution of the complete forms is as follows:

1. The originating office will retain the third copy and forward the original and first copy to the Equipment Bureau.

    a. If the work was approved locally, the Equipment Bureau will make copies of the original and disseminate the information to all shops as appropriate.

    b. If approval rests with the Equipment Bureau, the form will be appropriately annotated and signed; the second copy returned to the originating office; and copies of the original sent to all shops as appropriate.

EB85-1

EQUIPMENT MODIFICATION REPORT

1. SUBMITTED FOR : ☐ REPORT WORK ACCOMPLISHED
☐ REQUEST FOR AUTHORIZATION

2. TYPE OF CHANGE : ☐ FUNCTIONAL IMPROVEMENT
☐ DESIGN CHANGE
☐ MAJOR MODIFICATION

3. UNIT NUMBER OR CLASS: ____________ NUMBER UNITS INVOLVED: ____________

4. REASON FOR CHANGE: ____________

5. NATURE OF CHANGE: ____________

6. ESTIMATE OF LABOR, PARTS AND/OR MATERIALS:
(a) HOURS OF LABOR: ______ X $15 = ____________
(b) PARTS: ____________
(c) MATERIALS: ____________
(d) TOTAL FOR ONE UNIT: ____________ X ____________ (NO. UNITS) = ____________

7. LOCAL APPROVAL : ☐ APPROVED ☐ DISAPPROVED
☐ MAINTENANCE CHIEF
☐ SHOP SUPERINTENDENT

____________ (SIGNATURE) ____________ (DATE)

8. EQUIPMENT BUREAU APPROVAL : ☐ APPROVED ☐ DISAPPROVED

____________ (SIGNATURE) ____________ (DATE)

9. REMARKS : ____________

EQUIPMENT TRANSFER POLICY

This policy applies to the transfer of all vehicles and equipment under the administrative responsibility of the Equipment Bureau.

DEFINITIONS:

- Unit Assignment -- will be done exclusively by the Equipment Bureau and requires data entry to change the master equipment inventory file. The master file is also the basis for equipment related accounting functions.
- Permanent Transfer -- is a transfer between areas, districts or Helena on a permanent basis requiring a work or area number change to the master equipment inventory file.
- Temporary Transfer -- is a transfer between areas, districts or Helena on a temporary basis and does not require a work or area number change to the master equipment inventory file.
- Form EB 83-1 -- is the equipment transfer report which replaces all previous forms and must be completed when a unit is permanently transferred.

POLICY:

- The EB 83-1 form shall be completed for all permanent transfers.
- All permanent transfers, except engineering equipment reassigned within a district, will be to a maintenance area or to the Equipment Bureau.
    + Engineering equipment reassigned within a district will be to the appropriate equipment area number.
- The EB 83-1 form shall be initiated by the transferring area.
    + The last two pages of the form shall be completed by the receiving area.
- Initial assignment of equipment from Helena will be to a maintenance area. All related costs will be billed to that maintenance area until the second portion of the EB 83-1 form is received and a work area assigned.
    + Permanently transferred units between areas or districts will have all related costs billed to the transferring area until the first portion of the EB 83-1 form is received. Upon receipt, all related costs will be billed to the receiving maintenance area until the second portion of the EB 83-1 form is received and a work number assigned.

  - + For temporary transfers, charges for actual use will be billed to the using area; however, the work area number will not have been changed in the master file; subsequently, standby charges will be billed to the loaning area.

- Manuals and special tools should be transferred with a unit; however, it is the responsibility of the receiving area to ensure all items are complete.

- Transferred units that are anticipated to remain in the fleet should be thoroughly checked by the transferring area to ensure minimum serviceability. Units requiring major repair to meet minimum serviceability requirements will be repaired by the receiving area and charged to the transferring area.

  - + Units transferred to Helena for auction purposes will be clean and will have a memorandum attached to the EB 83-1 form listing all known problems or defects. Units not meeting these criteria will be cleaned and inspected in Helena and all related costs will be charged to the transferring area.

PREPARATION OF FORM EB 83-1:

Transferring Area:

- Column a -- list equipment number or serial number of each unit being transferred. The form facilitates the transfer of up to 12 items.

- Column b -- list a short description of the item(s) being transferred. Example -- ½-ton pickup; 3-ton dump w/plow; one way plow; sander; etc.

- Column c -- list the presently assigned work area number for each item.

- Column d -- list the appropriate maintenance or Equipment Bureau area number.

- Column e -- list the appropriate miles or hours. If not applicable, use N/A or leave the column blank.

- The individual preparing the form should sign and date it.

- The representative receiving the item(s) should cosign and date the form. This signature block may not be required on all transfers.

- Upon completion of the above, the white copy is forwarded to the Equipment Bureau; the yellow copy retained by the transferring area; and the pink and gold copies submitted with the item(s).

Receiving Area:

- Review the item(s) to insure serviceability and that all special tools, manuals, etc. are complete.
- Column f -- list the work area to which each item will be assigned.
- Sign and date the "received by" signature block.
- Forward the pink copy to the Equipment Bureau and retain the gold copy.

GENERAL:

- The EB 83-1 form must be completed for all permanent transfers.
  - No changes will be made to the equipment master inventory file without this form.
- It is not necessary to advise the Equipment Bureau of temporary transfers.
- It is not necessary to initiate teletypes pertaining to equipment or vehicle transfers.

This policy and form are subject to review and change. Please direct any problems or recommended changes to the Equipment Bureau.

BHB:1:JH:by:sf:27n/3

EXPLANATION OF EXAMPLES

Example Number 1	--reflects 9 units that are ready for transfer from Helena to Missoula.
Example Number 2	--reflects that the 9 units were picked up at the Helena shop. (If these units would have been delivered to Missoula, a "co-signed by" signature would not have been required.)
Example Number 3	--reflects the final action on the form. The work area number is assigned and, in this case, receipt is by the Shop Superintendent.
Example Number 4	--reflects a pickup transfer from Missoula Construction to Billings Maintenance and picked up by the state transport.
Example Number 5	--completes the transfer to Billings and assigns the pickup to Billings Construction.
Example Number 6	--reflects an engine transfer from the Helena shop to the Miles City shop delivered by the state transport.
Example Number 7	--the Miles City shop acknowledges receipt of the engine.
Example Number 8	--reflects an engineering unit transferred from Lewistown to Billings (reassignment of an engineering unit within a district).
Example Number 9	--completes the reassignment as denoted in Example Number 8.

BHB:1:JH:by:sf:27n/6

EXAMPLE 1

EB 83-1

MONTANA DEPARTMENT OF HIGHWAYS
EQUIPMENT TRANSFER REPORT

Equipment No. or Serial No.	Description	Transferred		Miles/ Hours	Work Area No.
		From (Area No.)	To (Area No.)		
a	b	c	d	e	f
07-0493	1/2 Ton Pickup	7093	1120	3	
07-0494				15	
07-0495				8	
07-0496				6	
07-0497				4	
07-0498	1/2 Ton Pickup			12	
19-2652	3 Ton Dump w/plow & sander			7	
19-2653				11	
19-2654	3 Ton Dump w/plow & sander	7093	1120	9	

Prepared by John Doe Date 10/28/83

Cosigned by ______ Date ______

Received by ______ Date ______

White - Equipment Bureau
Yellow - Transferring Area
Complete columns a,b,c,d &e when transferred

Pink - Equipment Bureau
Gold - Receiving Area
Complete column f when received

EXAMPLE 2

EB 83-1

MONTANA DEPARTMENT OF HIGHWAYS
EQUIPMENT TRANSFER REPORT

Equipment No. or Serial No.	Description	Transferred		Miles/ Hours	Work Area No.
		From (Area No.)	To (Area No.)		
a	b	c	d	e	f
07-0493	1/2 Ton Pickup	7093	1120	3	
07-0494				15	
07-0495				8	
07-0496				6	
07-0497				4	
07-0498	1/2 Ton Pickup			12	
19-2652	3 Ton Dump w/plow & sander			7	
19-2653				11	
19-2654	3 Ton Dump w/plow & sander	7093	1120	9	

Prepared by John Doe Date 10/28/83

Cosigned by Melvin Forty Date 10/31/83

Received by __________ Date __________

White - Equipment Bureau
Yellow - Transferring Area
Complete columns a,b,c,d &e when transferred

Pink - Equipment Bureau
Gold - Receiving Area
Complete column f when received

EXAMPLE 3

EB 83-1

MONTANA DEPARTMENT OF HIGHWAYS
EQUIPMENT TRANSFER REPORT

Equipment No. or Serial No.	Description	Transferred		Miles/ Hours	Work Area No.
		From (Area No.)	To (Area No.)		
a	b	c	d	e	f
07-0493	1/2 Ton Pickup	7093	1120	3	1120
07-0494				15	1120
07-0495				8	1120
07-0496				6	1140
07-0497				4	1130
07-0498	1/2 Ton Pickup			12	1130
19-2652	3 Ton Dump w/plow & sander			7	1120
19-2653				11	1120
19-2654	3 Ton Dump w/plow & sander	7093	1120	9	1120

Prepared by John Doe Date 10/28/83

Cosigned by Melvin J Pixty Date 10/31/83

Received by Cal Blatter Date 11-1-83

White - Equipment Bureau
Yellow - Transferring Area
Complete columns a,b,c,d &e when transferred

Pink - Equipment Bureau
Gold - Receiving Area
Complete column f when received

EXAMPLE 4

EB 83-1

MONTANA DEPARTMENT OF HIGHWAYS
EQUIPMENT TRANSFER REPORT

Equipment No. or Serial No.	Description	Transferred		Miles/ Hours	Work Area No.
		From (Area No.)	To (Area No.)		
a	b	c	d	e	f
07-0493	1/2 Ton Pickup	1130	5120	40,365	

Prepared by John Doe Date 11/18/83

Cosigned by Jerry [illegible] Date 11-20-83

Received by ______ Date ______

White - Equipment Bureau
Yellow - Transferring Area
Complete columns a,b,c,d &e when transferred

Pink - Equipment Bureau
Gold - Receiving Area
Complete column f when received

EXAMPLE

EB 83-1

MONTANA DEPARTMENT OF HIGHWAYS
EQUIPMENT TRANSFER REPORT

Equipment No. or Serial No.	Description	Transferred		Miles/ Hours	Work Area No.
		From (Area No.)	To (Area No.)		
a	b	c	d	e	f
07-0493	1/2 Ton Pickup	1130	5120	40,365	5130

Prepared by John Doe Date 11/18/83

Cosigned by Jerry Teafu Date 11-20-83

Received by Frank Moore Date 11-21-83

White - Equipment Bureau
Yellow - Transferring Area
> Complete columns a,b,c,d &e when transferred

Pink - Equipment Bureau
Gold - Receiving Area
> Complete column f when received

EXAMPLE 6

EB 83-1

MONTANA DEPARTMENT OF HIGHWAYS
EQUIPMENT TRANSFER REPORT

Equipment No. or Serial No.	Description	Transferred		Miles/ Hours	Work Area No.
		From (Area No.)	To (Area No.)		
a	b	c	d	e	f
PM36001552	300 Cummins Engine	0793	5240	N/A	

Prepared by Bob Strainer Date 11/21/83
Cosigned by ______ Date ______
Received by ______ Date ______

White - Equipment Bureau
Yellow - Transferring Area
Complete columns a,b,c,d &e when transferred

Pink - Equipment Bureau
Gold - Receiving Area
Complete column f when received

EXAMPLE 7

EB 83-1

MONTANA DEPARTMENT OF HIGHWAYS
EQUIPMENT TRANSFER REPORT

Equipment No. or Serial No. a	Description b	Transferred From (Area No.) c	Transferred To (Area No.) d	Miles/ Hours e	Work Area No. f
PM36001552	300 Cummins Engine	0793	5240	N/A	5240

Prepared by Bob Strainer Date 11/21/83

Cosigned by ______ Date ______

Received by Ralph Kaye Date 11/22/83

White - Equipment Bureau
Yellow - Transferring Area
Complete columns a,b,c,d &e when transferred

Pink - Equipment Bureau
Gold - Receiving Area
Complete column f when received

EXAMPLE 8

EB 83-1

MONTANA DEPARTMENT OF HIGHWAYS
EQUIPMENT TRANSFER REPORT

Equipment No. or Serial No.	Description	Transferred		Miles/ Hours	Work Area No.
		From (Area No.)	To (Area No.)		
a	b	c	d	e	f
07-0274	1/2 Ton Pickup	5340	5140	100,027	

Prepared by Irvin Steinert Date 8/30/84
Cosigned by John Doe Date 8/30/84
Received by ______________ Date ______

White - Equipment Bureau
Yellow - Transferring Area
Complete columns a,b,c,d &e when transferred

Pink - Equipment Bureau
Gold - Receiving Area
Complete column f when received

EXAMPLE 9

EB 83-1

MONTANA DEPARTMENT OF HIGHWAYS
EQUIPMENT TRANSFER REPORT

Equipment No. or Serial No.	Description	Transferred		Miles/ Hours	Work Area No.
		From (Area No.)	To (Area No.)		
a	b	c	d	e	f
07-0274	1/2 Ton Pickup	5340	5140	100,027	5130

Prepared by Irvin Steinert Date 8/30/84

Cosigned by John Doe Date 8/30/84

Received by Frank Moore Date 8/30/84

White – Equipment Bureau
Yellow – Transferring Area
Complete columns a,b,c,d &e when transferred

Pink – Equipment Bureau
Gold – Receiving Area
Complete column f when received

Transfer of Engineering Units Between Maintenance Areas within a District

The accounting consolidation of construction from area to districts presents minor problems with the master equipment inventory file as regards transfers of engineering units within a district.

The master file is keyed by equipment area -- 1140, 5140, etc. This number has always been generated in Helena based on the work area assigned by the field. For example, a pickup assigned to Billings Construction would appear in our file as assigned area 5140 and work area 5130. The assigned area is used for inventory purposes and work area is used by Accounting for billing purposes.

As a result of the consolidation, Area numbers for construction are no longer valid, such as 1230, 5330, etc. All field construction will now use one of the district prefixes:

• Missoula and Kalispell	1130
• Butte and Bozeman	2130
• Great Falls and Havre	3130
• Glendive, Miles City and Wolf Point	4130
• Billings and Lewistown	5130

The Equipment Transfer Report, if filled out according to the policy and with the above change, would show the transfer of a pickup from Lewistown to Billings as from Area 5130 to Area 5130. This presents no problem for accounting purposes; however, it could result in numerous inventory problems.

JH:1:by:sk:227s1

As a result of the above, and for engineering units only, please prepare the Equipment Transfer Reports as follows:

- Column c (from) -- use the equipment area number that the unit is presently assigned to;
- Column d (to) -- use the equipment area number to which the unit is transferred; and,
- Column f (work area no.) -- use the appropriate district construction number.

This change only applies to engineering units transferred within a district. The District Construction Supervisors or their designee, should advise you when these changes are made.

Examples of Form EB83-1 have been prepared to reflect the transfer of a construction pickup from Lewistown to Billings:

- Example 8 -- as initiated by Lewistown with copies forwarded as per the policy; and,
- Example 9 -- as received by Billings with copies forwarded as per the policy.

JH:1:by:sk:227s2

District Delegated Transportation of Commodities

I. FIELD PROCEDURES

A. Transport Requirements

1. All district transports shall be equipped with flares, signs, lights, flagging, first aid kit, minimum of 8 chains and binders, exhaust covering, spare tires, jacks, tire wrenches and necessary blocking.

2. All loads shall be of legal weight, height, width and length. Appropriate permits shall be obtained for loads not meeting these criteria.

3. All transport operations shall comply with the following Public Service Commission requirements:
   a. Appropriate Commercial Driver's license.
   b. Daily log book that includes:
      (1) Commodities transported.
      (2) Amount of actual daily driving time (not to exceed 10 hours in any 24 hour period).
      (3) Loading and driving time if appropriate (not to exceed 15 hours in any 24 hour period).
      (4) Total weekly actual driving time not to exceed 70 hours.
   c. Minimum medical requirements:
      (1) 20/40 eyesight--standard or corrected.
      (2) No history of diabetes, epilepsy or heart disease.
   d. Suggested minimum test requirements:
      (1) Obtain required certification.
      (2) Pass written examination.
      (3) Demonstrate proficiency in placing and securing loads.

4. It is recommended that transport operators be responsible for placing and securing the loads with assistance provided as deemed necessary by the appropriate supervisor.

5. Each district shall develop a formal policy for scheduling of transports within their district which shall include the following:

   a. Who will be responsible for transport scheduling.

   b. A procedure for tracking transported items.

   c. Operator responsibilities.

B. Payload Requirements

1. Trips, other than emergencies, should be planned to ensure that the transport is fully loaded both directions.

2. For trips to Helena, a list of items, by destination, shall accompany each load.

    a. In the case of vehicles or equipment, an Equipment Transfer Report shall accompany all such items.

3. All trips shall be scheduled to provide ample unloading/loading time. Trips to Helena may require the operator to stay overnight.

C. Scheduling

1. Scheduling of trips within the district will be as per A.5.

2. For trips to Helena, the districts will inform the Equipment Bureau by teletype of transport dates. With exception of emergencies, teletypes should be sent at least one week in advance of the trip.

    a. The Equipment Bureau may request minor schedule changes to preclude loading all five transports on the same day.

3. Helena contact points:

    a. As items awaiting field distribution are normally always available at Helena Stores and Mail and File, these locations are mandatory contact points.

        (1) Helena Stores and Mail and File hours are 7:30 A.M. to 4:00 P.M. Monday through Friday.

        (2) The Helena Stores stockman will provide loading assistance as necessary for Stores items during normal working hours. Please phone prior to the trip to ensure that your stock is ready to load when the transport arrives.

    b. The contact point for all other Helena offices will be the Helena Shop.

        (1) The Helena Shop will not load any district transport until all other offices have been contacted.

        (2) The Helena Shop will provide loading assistance as deemed appropriate by the Shop Superintendent for equipment related items only.

II. HEADQUARTERS PROCEDURES

A. Scheduling

1. Upon receipt of a teletype from a district, the Equipment Bureau will make copies and distribute to the following offices:
   a. Sign Shop
   b. Materials Bureau
   c. Contract Plans
   d. Construction Bureau

2. Anyone desiring to ship items on one of the transports will be required to list the items by district, list a contact person and phone number, and submit this information to the Equipment Bureau prior to the transport date.

3. The Equipment Bureau will establish an "in box" for each district in the Helena shop. All requests for transportation received from Helena offices, other than Helena Stores and Mail and File, will be placed in the appropriate box.

4. Transport operators will be given the list(s) when they contact the Helena Shop.

5. Items requiring immediate delivery should be coordinated directly with the appropriate district.

   NOTE: The Equipment Bureau assumes no responsibility for coordination of transports, shipments, schedules, loading or unloading other than that specifically provided by this policy.

Flexible Equipment

Due to varying seasonal workloads between maintenance and construction, limited funds for equipment replacement, repair and maintenance considerations and in an effort to keep the fleet to the lowest possible number, the following policy pertains to light duty equipment (pickups, vans, suburbans, etc.).

- Project Managers, survey crews, and maintenance sections requiring full time use of this type of equipment will be assigned the equipment on a permanent basis. The remainder of the equipment, both construction and maintenance, will be considered flexible equipment, and will be controlled by the Maintenance Chiefs.

- The Maintenance Chiefs will be responsible to insure that the flexible equipment is properly maintained and adequately utilized and that needs are met in both construction and maintenance.

- The District Engineers will be responsible to insure that the flexible equipment is adequately utilized within their districts.

- The Equipment Bureau is responsible to insure adequate numbers of flexible equipment to meet Department needs and retains the authority to transfer equipment between districts to achieve that end.

JH:1:by:sk:227s18

Rental rate assignment charges on flexible equipment are as follows:

- Assigned costs are charged to the area predominantly using the unit.
    - + Separate charges within a monthly billing period are prorated by hours of usage.
    - + The monthly rate is recovered regardless of hours of usage from the assigned area.

Over Age and Mileage Equipment

Due to department priorities, older units may have to be used to satisfy a variety of needs. To minimize the cost of continued operation, the following guidelines are established:

- Extensive repairs shall be defined as expenditures for parts and/or labor that would exceed $600.00 over a six month period. In other words, if the over age and mileage equipment cannot be kept serviceable for a six month period, for $600 or less, then it should be considered unserviceable.

- For example, if an overage and mileage unit requires a valve job, and the cost for parts and labor are estimated at $450, then the unit would be a candidate for repair as long as the unit can be expected to operate without major additional repair for the six month period. We should not expend $450 on a valve job, back the unit out of the shop, and have the transmission go out.

- Safety features (front end, tires, etc.) and general condition must also be considered.

- It is recognized that determination of possible vehicle life is discretionary.

JH:1:by:sk:227s21

Equipment Repair by Local Vendors

Repair of department equipment by commercial shops in outlying locations may be approved by the Maintenance Chief under the following circumstances:

- To expedite repairs in outlying areas.
- Authorized repairs shall not exceed two hundred dollars for all parts and labor.
- The Maintenance Chief is responsible for determining the cost benefit prior to authorizing the work.

This policy allows for repair of minor items such as fuel or water pump replacement, miscellaneous welding, etc. It applies to outlying areas only and is not intended to displace large portions of work normally done by department shops.

JH:1:by:sk:227s23

Equipment Inspection

Inspections shall be conducted on all department vehicles and pieces of equipment in accordance with the following policy:

- The Shop Superintendent, or their designee, will inspect each section and each project once per calendar year;
- The inspection will cover those items required by the Preventative Maintenance portion of the Equipment Management System; and,
- A memorandum will be prepared listing the results of the inspections. Copies of the memorandum will be provided to;
    - The appropriate Field Maintenance Supervisor and Maintenance Superintendent; or
    - The appropriate Project Manager and District Construction Supervisor; and, in all cases,
    - The Maintenance Chief and Equipment Bureau.

The inspection report should be general in nature with the results summarized. It is intended to be used as an aid in determining overall PM effectiveness of preventative maintenance program compliance in a section, project or area.

An inspection report file should be maintained by the Shop Superintendent.
JH:1:by:sk:227s27

Tires

- Radial Tires - may be mounted on vehicles at the Shop Superintendent's discretion considering such things as anticipated length of service, vehicle condition, anticipated use, etc. It is expected that these tires will be used on a cost benefit basis.

- Studded Tires - The Equipment Bureau policy pertaining to winter tires is as follows:

  + Studded tires shall remain "unauthorized" due to:

    ++ Availability of other types of tires that perform as well;

    ++ Damage to highways and structures; and,

    ++ Seasonal mounting costs.

  + All Season radials are recommended for general use.

  + In unique circumstances, and at the discretion of the Maintenance Chief, radial mud and snow tires may be used.

Safety

R.O.P.S. PROTECTION

Approximately 50% of the motor patrols, all of the full-tracked dozers and many tractor mowers do not have roll-over protection. Continued use of equipment without R.O.P.S. necessitates the following policy:

- Department fabrication of R.O.P.S. devices does not constitute M.O.S.H.A. approved safety protection. This practice must be immediately discontinued; and
- Mowers, as with motor patrols and crawler tractors, that do not have approved M.O.S.H.A. roll-over protection, should not be operated under conditions with the potential for roll over.

Attrition of existing equipment will eventually resolve the R.O.P.S. problem. Until that time, reasonable conformance to the above policy is the only way we will be allowed to continue to operate the older units.

Flashing Amber Lights

Construction contract special provisions require contractors' personnel to use flashing amber lights. As such, use of these lights on engineering vehicles and equipment is hereby approved.

This approval should not be construed as a blanket endorsement for installation of lights on all units within the fleet. These lights should be used as per Chapter 3, Section 3.60 of the Maintenance Manual and Chapter 5, Section 5.2.3. of the Safety Manual.

Lights installed on units that are one ton or less should incorporate a non-permanent mounting system -- magnetic base, stake pocket mounting bracket, etc. -- whenever possible. Permanent mounting that damages body components should be discouraged.

JH:1:by:sk:227s/37

Retrofitting Class 19, 27, and 29 Trucks

As upgrades to trucks are made in each model year, there are improvements and changes from previous years. As budgets do not include sufficient funds for major retrofitting projects, the following will apply:

- Earlier units will not be upgraded to new unit standards unless;
    - + Changes to components improve operational characteristics and are initiated by the Equipment Bureau. An example may be a hydraulic system revision.
    - + Changes to improve safety, comfort, etc. have been initiated by the Equipment Bureau.
    - + Changes have been approved through the Equipment Modification Policy.

Engine Replacement

The following engine replacement policy for both gas and diesel engines is designed to ensure an adequate supply of rebuildable parts.

- Engines will be replaced at the discretion of the Shop Superintendent under the following guidelines:
    - + Engines should be replaced early enough to preclude major failure and assure rebuildable components; and,
    - + They should be run long enough to assure maximum cost benefit.

Pintle Hitch Conversion

The following policy will govern the conversion from "pin type" to pintle hitches:

- The Equipment Bureau will provide bolt on adaptor plates to easily convert a pintle type tongue to a pin type hitch;
- As new units with pintle hitches are assigned to sections, the other units within the section will be converted as necessary; and,
- Area wide equipment will also be converted as necessary.

This will reduce the impact on the budget and provide a transition period to accomplish the change.

Towing of Private Vehicles with State Owned Units

Department vehicles and equipment should not be used for towing private vehicles unless so directed by the Highway Patrol, or, leaving a vehicle on the actual roadway will result in more serious injury or accident. Under no circumstances should a department unit be used to remove a private vehicle that is off the roadway.

In the rare instance where we may be required to move a private vehicle, all safety precautions -- such as signs, flagging, etc. -- should be taken.

JH:1:by:227s/41

One Ton Dump Trucks

One-ton units may be assigned to any section; however, they will replace the pickups in all sections supervised by a Field Maintenance Supervisor A and/or they may be assigned in addition to a pickup in sections supervised by a Field Maintenance Supervisor B.

Exceptions to this policy will be considered on a case-by-case basis by the Equipment Bureau upon receipt of written justification. Trade-ins or reassignment will be required on all units not assigned to Field Maintenance Supervisors B's.

JH:1:by:227s/42

65 MPH Speed Limit

Recently passed legislation has increased the speed limit to 65 mph on most interstate highways in Montana. The 55 mph speed limit remains in effect on all other roads and short sections of interstate through Missoula, Great Falls and Billings.

As a result of the above, Department of Highways units up to, and including, Class 12 - Vans, may operate at 65 mph on the approved sections of interstate. All units above Class 12, will be restricted to a maximum 55 mph on all roads.

The Governor's Executive Order 9-79 will continue to be the rules for employees while travelling on state business if convicted of speeding. The executive order requires "first offense, notification to agency; second offense, official reprimand with copy to permanent personnel file; third offense, dismissal from state employment."

JH:1:by:227s/43

Revised Snooper Truck Policy

Introduction

The new snooper trucks were purchased to accommodate inspection of bridges that cannot be reached by conventional equipment or means. Therefore, required inspections shall receive priority. When required inspections are complete, the trucks may be scheduled and used for normal bridge inspection and/or maintenance. Nothing in this policy precludes immediate reassignment in the event of an emergency.

Definitions and Terms

Assigned Location -- is a specific maintenance area to which the truck will be permanently assigned.

User -- is one or more other maintenance areas that will schedule use of the truck through an assigned location, or is a specific individual, unit or section that requires use of the truck.

Policy

Assigned Location Responsibilities:

- Coordinate use of the truck within the assigned location and assist users in developing schedules to ensure all requests for use are met on a timely basis.

- Maintain a comprehensive maintenance file and provide shop guidance to users.

User Responsibilities:

- Request use of the truck, by specific dates, from the assigned location.

- Each maintenance chief will be responsible for the truck while it is operating in their specific geographic area. Additionally, the shop and/or operator in the using location will contact the assigned location shop prior to performing any work on the truck and will forward a completed work order listing any and all work accomplished.

- It is recommended that the truck and all components be thoroughly inventoried when transferred between locations. Discrepancies should be reported to assigned location shop.

  + It is further recommended that a log book be kept with each unit so that the operator may record any unusual operating characteristics or problems. This would provide a detailed record of problems and repairs.

Assignment of Operators:

- Operators for the trucks will be provided by each maintenance area in which the truck is operated when other maintenance activities do not preclude an employee from being available.
- If a maintenance employee is not available, a non-maintenance employee may operate the truck on a situation-by-situation basis.
- Any individual operating the truck must be properly licensed and trained.
- The boom operator must be provided by the user. This may require coordination through the maintenance chiefs of the assigned location and the location of use.

Assigned Locations:

- Missoula -- 34-034
    User Locations:
        + Kalispell
        + Butte

- Billings -- 34-035

  User Locations:

  + Bozeman
  + Great Falls
  + Havre
  + Glendive
  + Wolf Point
  + Miles City
  + Lewistown

- Great Falls -- 34-004

  User Locations -- any requesting maintenance area.

All Equipment Bureau policies regarding purchasing, repair authorization, modification, warranty, etc., remain in effect. No individual, other than a trained mechanic, is to perform any repair, adjustment, or maintenance work on the truck or boom. Persistent mechanical problems should be reported to the Equipment Bureau.

Mowing Policy

Requiring mowers to mow with traffic unless a specific area is signed and flagged may be contributing to private vehicle damage, especially broken windows.

Rotary mowers whose blades operate in a clockwise direction appear to have a tendency to throw objects out onto the road and into oncoming vehicles.

To reduce this problem, mowers may be operated against traffic without signing and flagging under the following circumstances:

- When the mower throws more debris onto the road when operated with traffic than against it.
- When mowing and turning can be done without getting any portion of the tractor or mower on the road.

All other circumstances require either mowing with traffic or using signs and flagmen.

Specially Equipped Pickups and Utility Vehicles

The following policy governs the assignment and reassignment of specially equipped pickups and utility vehicles:

- Initial assignment of specially equipped pickups and utility vehicles will be to project managers, maintenance superintendents or district lab supervisors.
    - + Units shall be driven a minimum of 90,000 miles while assigned or reassigned within these classifications.
- After reaching 90,000 miles, the units may be reassigned at the discretion of the maintenance chief to best meet the needs of the department.

EMS-1289.10

Truck Load Limits

INTRODUCTION

The Department of Highways has established the following policy regarding overloading of department vehicles. The purpose of the policy is to establish procedures for handling situations when a department vehicle is found to be overweight and create a mutual understanding of when Department of Highways vehicles will be weighed.

GENERAL INFORMATION

It is the responsibility of the Department of Highways to build, maintain and protect the highway system in the state. Part of protecting the highway system is to ensure that all trucks, whether they are city, county, state or industry-owned, are loaded properly. Federal and state laws require that trucks meet certain criteria when loaded. The Federal Bridge Formula B establishes maximum weights for truck axles and groups of axles. Federal and state laws limit the loads to 20,000 lbs. per single axle and 34,000 per tandem axle.

POLICY

Department of Highways personnel will follow state and federal laws regarding the loading of department vehicles.

JH:1:by:227s/50

Waiver of this policy is granted when immediate action is necessary to (1) protect or preserve public health or welfare, (2) prevent closure of roadways, (3) prevent heavy damage or deterioration of the roadway such as flood or other natural disaster, or (4) snow removal operations consisting of sanding or plowing. In such situations, the public benefit from the overweight MDOH vehicles outweights the effect of heavy loads on the highway. Whenever possible, steps should be taken to ensure that the number of overloads during the above is kept to a minimum.

PROCEDURES

1) Supervisors are to inform all employees in their areas of this policy.

2) As is the custom in all day-to-day operations, maintenance employees and GVW employees shall communicate, coordinate, and cooperate at all times. Checking of gross weight and distribution to axles may be necessary prior to the beginning of a maintenance activity.

3) During daily maintenance operations, maintenance employees shall limit the loads on trucks to 20,000 lbs. on single axles and 34,000 on tandem axles.

4) During maintenance operations when department trucks are hauling past a weigh station, the loaded trucks shall proceed through the scale and be weighed on the first load for each truck each day. Loaded trucks must

pass through the scale bypass lane on subsequent loads and shall at any time be subject to random weighing by GVW scale personnel.

5) Department of Highways trucks may be weighed by GVW roving crews at any time.

6) If a Department of Highways truck is found to be overweight, a GVW Form 161 will be completed. The original white copy will be sent to the District Engineer, the yellow copy will be sent to the Director of Highways, and the third copy will be issued to the driver. The load will be adjusted to legal weights. With the issuance of a GVW Form 161, disciplinary action will be taken according to department policies.

CLOSING

By following this policy, the department will be providing consistent and fair application of the laws to protect the investment Montanans are making in their highway system. The department will be complying with its obligation to protect the highway system.

JH:1:by:227s/52

Department Vehicle Use

INTRODUCTION

Questions have been raised regarding use of state vehicles. The law is specific and reads in part, "no state officer or employee shall use any state-owned or leased motor vehicle for his own personal and private use."

POLICY

Recognizing that certain uses of a state-owned vehicle are necessary for the conduct of official business, this policy has been developed to provide general guidelines to assist in determining such use. All situations or circumstances cannot be covered by one policy.

Terms and Definitions:

1. Authorized Use - is use of a state-owned or leased vehicle that is necessary for, or arises from, the conduct of state business, such as traveling between business locations, project sites, and/or staying overnight at locations other than an employee's permanent headquarters.

2. Unauthorized Use - is use that would violate the law, supervisor's instructions, or any other action or use that would be unlawful in a private vehicle.

3. Department/Department Vehicle - is the Department of Highways and includes all vehicles, trucks, and/or other specialized units owned or leased by the Department of Highways.

PROCEDURES

1. During working hours:

   a. Vehicles are provided for authorized department use only.

   b. Employees may use department vehicles for the conduct of official business and/or for transportation for meals when a meal allowance is authorized.

   c. If an employee is unexpectedly placed in a travel status during a normal non-travel shift, a department vehicle may be used to obtain personal travel items such as clothes, funds, etc.

   d. Transportation of personal items (those typically allowed by common carrier) while traveling for official business is authorized. Using a department vehicle specifically for transportation of personnel, goods, or other items not related to official business is unauthorized.

2. After working hours:

   a. Use of a department vehicle is authorized for the conduct of official business and/or for transportation for meals or lodging.

3. Disciplinary action

   a. Disciplinary action, in accordance with the discipline handling policy, shall be taken for unauthorized use of a department vehicle.

CLOSING

This policy may be changed at any time without notice.

JH:1:by:227s/55